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ES. EXECUTIVE SUMMARY



This Executive Summary has been produced to give the reader a general foundation to understand all transportation issues affecting the City of Mesa over the next 25 years. This summary reflects over two years of citizen participation and represents a microcosm of the Mesa Transportation Plan (MTP) that encompasses over one hundred pages of text, maps, tables, and illustrations detailing the long term strategies to provide a transportation system within Mesa that will create a sustainable community with high quality transportation choices.

In 2000, the City began updating the MTP. The City's plan had not been updated in a number of years and there was a realization that the City lacked funding to maintain the existing street system *and* provide improvements and extensions to meet the needs of our growing community.

The City of Mesa has grown very rapidly over the past twenty years, resulting in a much larger network of arterial and local streets. However, during that same period, transportation funding has not kept pace with the growth of the street system. As a result, most of the City's transportation funding is now needed to maintain minimum operating and maintenance standards for the transportation system. Under the current funding scenario, funds will be available to pay the city portion of construction costs associated with new development, but very little money will be available to address existing and future congestion.



In effect, Mesa is facing a choice. The City could continue to maintain the existing street system, which grew rapidly for the last thirty years, and has aged, and is therefore more expensive to maintain. Or, the City could continue to improve existing arterial streets and intersections that are congested. In view of projections for continued growth, it seemed essential for the City to continue to provide these improvements. Choosing maintenance versus future improvements was not a choice that the City wished to make without citizen input and studying the issue through the update to the MTP.

The other reason for the update to the MTP, is to consider providing a more comprehensive system of transportation services. Such a transportation system might include enhancements to serve pedestrians and bicyclists, and to provide for more than a "bare bones" bus service. This system would be a multi-modal approach that would give citizens choices for getting around the community instead of being reliant on the automobile. As the population of the Valley continues to grow, it will be more important that we give people transportation choices, particularly in light of the traffic congestion that we face in Mesa and the region.

Obviously, the choice that we make regarding the type of transportation system we desire will have a profound impact on the City in the future.

Recognizing the need for strong, visionary planning, the City of Mesa initiated a comprehensive process in the summer of 2000 to shape and guide the City's future development. Called **Mesa 2025 – A Shared Vision**, the process involved updating the City's General Plan, Parks and Recreation Plan, Economic Development Plan, and Transportation Plan.

The MTP represents the culmination of thousands of hours of research, study, and discussion involving the public, citizen committees, elected officials, and city staff. Specifically, there were 19 meetings with the citizen committee and 19 separate public meetings. The MTP presents a concise picture of current and future conditions, and articulates the community vision to promote and sustain a strong urban city. The plan establishes a coordinated framework for implementing the following transportation vision, as defined by the Joint Master Planning Committee:

A people-friendly transportation system of streets, mass transit, non-motorized vehicles, all interconnecting the business hubs and strong neighborhoods.

The MTP is about providing choices for how we travel to our destinations, whether by car, bus, or on foot. During the **Mesa 2025** planning process, people consistently asked for more choices for how they travel. Without viable choices, many of our citizens are forced to make their trips in a personal vehicle, which is expensive, adds to already congested streets, and worsens our air quality. So it was important for the plan to address multiple forms of transportation, including transit, biking, walking, and auto travel, and to provide a blueprint for providing viable choices in the future.

The MTP is based on being responsive to community values, protecting and enhancing the quality of Mesa's neighborhoods and the natural environment, and supporting and enhancing economic development and vitality. In addition, the MTP addresses the connection between land use and transportation, and recommends options for improving this relationship over the next 25 years.

Local and Regional Growth

Growth, both within and around Mesa, will have a profound impact on how people choose to travel in the future. The Phoenix-Mesa Metropolitan Statistical Area (MSA) had the second highest growth rate in the country between 1990 and 2000. Maricopa County will continue to grow in the future from just over three million people in 2000 to an estimated six million people in 2025. Mesa is the third largest city in the state and accounts for 13 percent of Maricopa County's population. According to the City's General Plan, population will increase 61 percent to 636,000 people in 2025 and employment will increase 130 percent to 358,000 employees. This results in a doubling in vehicle-miles of travel in the City as shown in Figure ES-1.

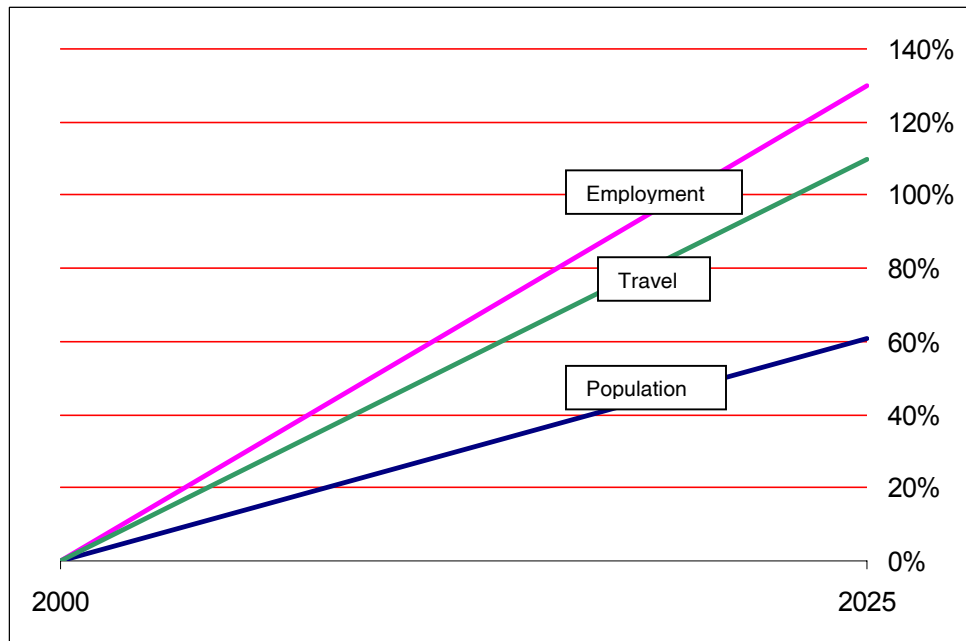


Figure ES-1: Mesa's Growth

Nearly all transportation experts agree that a community cannot “build its way out” of its traffic congestion problems and that a multi-modal transportation system is a more practical approach. Such a multi-modal transportation approach will require a greater investment in a broad range of transportation modes. For years, Mesa has had a “bare-bones” bus system. Local bus needs are expected to increase at a rate comparable to or faster than the rate of population growth. Bicycle facilities are needed for both the commuter and recreational riders. Providing pedestrian enhancements will encourage walking for shorter trips. Transportation demand management techniques can reduce single occupant vehicles and improve air quality.

The practice of widening streets and freeways has limits in terms of reducing traffic congestion. New capacity is usually quickly consumed as the area continues to grow, or even quicker when people who had previously avoided driving in the area return following completion of the project. During the development of this plan, there was a great deal of discussion on which arterial streets should be widened and how to provide viable choices for urban travel.

The transportation planning process included an extensive public involvement program. Public comments were received from community leaders and the general public. The comments covered all modes of travel and fit the theme of the importance of providing choices for travel.

The following is a summary of public comments received during the planning process:

- *Provide a safe, convenient and affordable transit system with local bus routes, express/commuter bus routes, and circulators that will attract and retain passengers*
- *Provide light rail service*
- *Build intermodal center in downtown Mesa to connect light rail and commuter rail*
- *Complete freeway system*
- *Intersection improvements*
- *Need to widen some east-west streets*
- *Neighborhood safety is an issue*
- *Develop canal banks for bikes, walkers, & joggers*
- *Develop a system of uninterrupted bicycle routes*
- *Separate sidewalks from the street*
- *Promote car pooling*
- *People should be able to walk to the corner store*
- *Funding a multimodal system is a significant short and long term issue facing the city of Mesa*

Clearly, these needs and concerns expressed by the public indicate the need for a multi-modal approach to provide for the transportation needs of the City and to provide the citizens with the quality of life expected in a major urban area.

As a result, the development of this transportation plan examined growth projections, economic development areas, constraints and opportunities to expand the transportation system. The result is a comprehensive multi-modal plan that provides safe and efficient options for travel in the City of Mesa.

However, there is a substantial cost associated with implementation, operation, and maintenance of such a comprehensive transportation system. Current funding cannot support implementation of the plan. In fact, current funding levels will only provide for current transportation system needs without any additions. New facilities and services are needed to improve the system as well as to accommodate the projected growth and to establish Mesa as a desirable place to live, work, and play, and therefore necessitates the need to identify additional funding sources.

Plan Organization

The Mesa Transportation Plan is composed of a series of integrated elements, including an analysis of existing and future conditions, individual modal plans, a downtown transportation plan, a finance plan, and an implementation plan. Each element builds upon other plan elements, and is framed within the context of study goals, objectives, and policies established as part of the **Mesa 2025** planning process. A separate Technical Report documents the analysis procedures used to develop the MTP.

Street Plan

The arterial street system forms the backbone of the city's multi-modal transportation system. A street is more than curb, gutter, and pavement built to serve the private automobile. The street right of way is shared by several different transportation modes including automobiles, trucks, buses, bicycles and pedestrians. Improvements to the street system must balance the needs of all modes. The street system provides access to activity centers, supports new development, and provides for recreational travel. While widening streets adds capacity to the system, it cannot eliminate congestion. The modern street system provides a combination of integrated components that can work together to manage congestion.

The street plan was designed to address many of the capacity needs, provide system continuity, improve system maintenance, and support growth and economic development areas. The preferred street system plan incorporates a combination of different improvement projects including new 4 and 6-lane streets, widening of existing streets, intersection improvements, and new parkway/freeway facilities. The recommended street plan showing the build out number of lanes and location of intersection improvements is summarized in Table ES-1 and shown in Figure ES-2. Capital projects are identified in five priority groups. Each priority group is planned for completion in five-year increments, which coincides with the City's 5-Year Capital Improvement Program.

TABLE ES-1: Street Plan Improvements by Project Type

IMPROVEMENT TYPE	TOTAL
Intersection improvements (#)	20
New two-lane street (mi.)	1.5
New four-lane street (mi.)	26
New six-lane street (mi.)	72.75
Widen from four to six lanes (mi.)	72.25
New six-lane parkway (mi.)	4.6
Convert arterial to parkway (mi.)	6

The Street Plan also provides for other important projects and programs, including neighborhood traffic management, safety education programs, and partnering with ADOT to accelerate freeway improvements. In addition to capital street projects, funding is also identified for operating and maintaining the street system. Such maintenance includes pavement overlays and other repairs that are necessary to keep the street system properly maintained. Failure to provide for such funding will result in roads failing, resulting in more costly street reconstruction in the future.

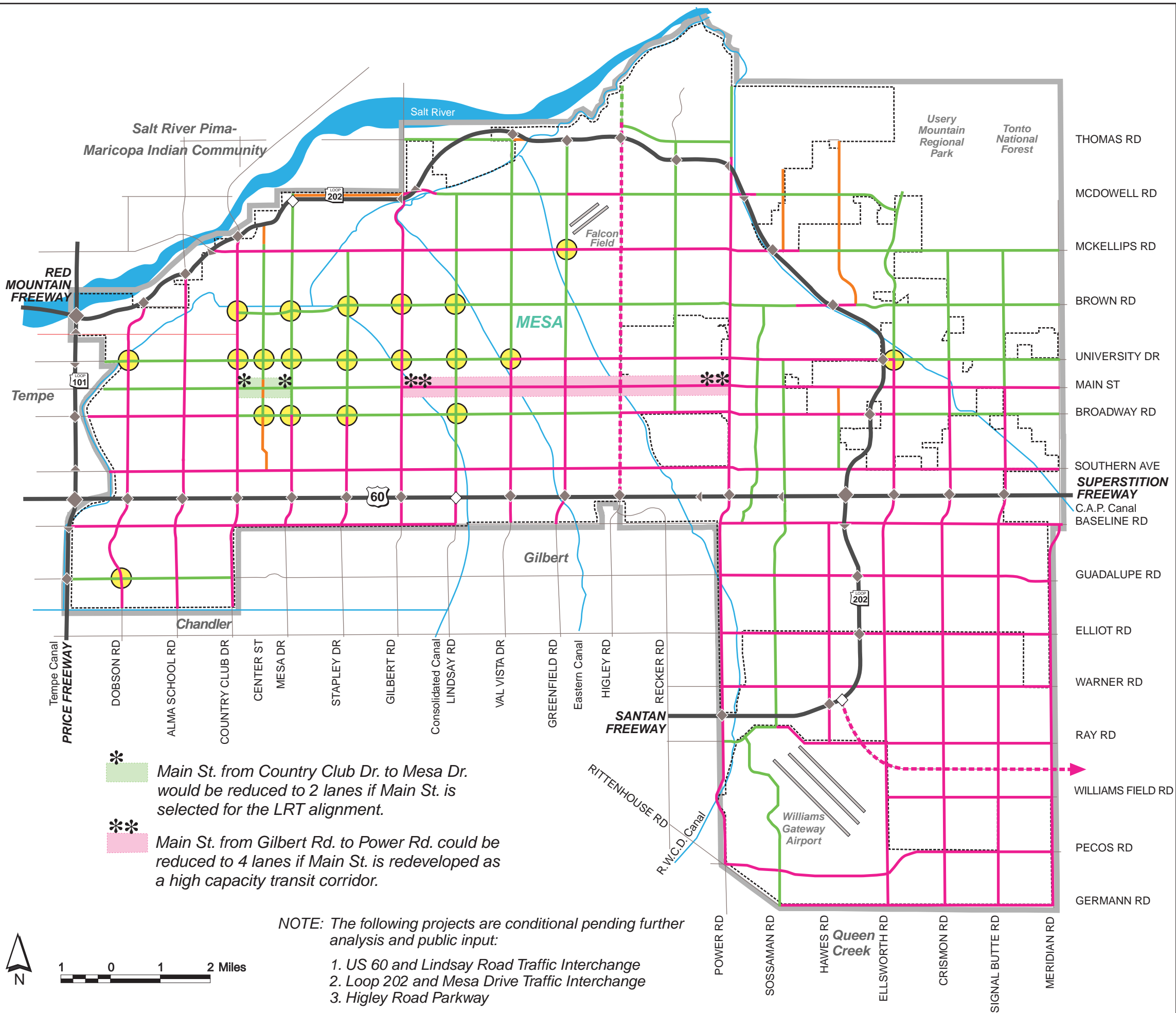
Transportation Plan



Recommended Street Plan

Figure ES-2

- Intersection Improvement
- 6 Lane Parkway
- 4 Lane Parkway
- 6 Lane Arterial
- 4 Lane Arterial/Collector
- 2 Lane Arterial/Collector
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



Transit Plan

Transit will play an increasingly important role in the City of Mesa transportation system. The need for a reliable transportation alternative is an important element in a multi-modal transportation system. There is a tremendous need to provide a variety of transportation options, given population growth projections for the City and region. Improved transit service through expanded coverage and increased frequency, combined with the implementation of transit priority measures, will attract new riders and provide transportation alternatives.

The current City of Mesa bus system is a combination of local and express routes. In fiscal year (FY) 99-00, the city funded system carried over one million passengers. Many of Mesa's existing transit riders are transit dependent. Improved transit service through expanded coverage and increased frequency, combined with the implementation of transit priority measures, will attract new discretionary riders.

The Plan provides a full range of transit technologies including local bus, express bus/bus rapid transit (BRT), circulators, transit priority corridors, light rail transit, paratransit, and commuter rail. It also includes transit facilities such as park and ride lots, a downtown transit center, and an operations and maintenance facility.

Table ES-2 summarizes the transit plan by amount of proposed service and planned facilities. The recommended long-term transit service plan is illustrated in Figure ES-3. Transit projects are divided into three priority groups: Short-Term (1-5 Years); Medium Term (6-15 Years); and Long-Term (16-25 Years).

Table ES-2: Transit Plan by Type of Service and Facility

SERVICE	PLAN
Local bus routes	24 routes
Express bus routes	5 routes
Light rail transit	4 miles
Circulators	3 areas
Paratransit	City coverage
FACILITY	PLAN
Park and Ride Lots	5 lots
Transit Center	1
Operations & Maintenance Facility	1
Shelters	90 (new)

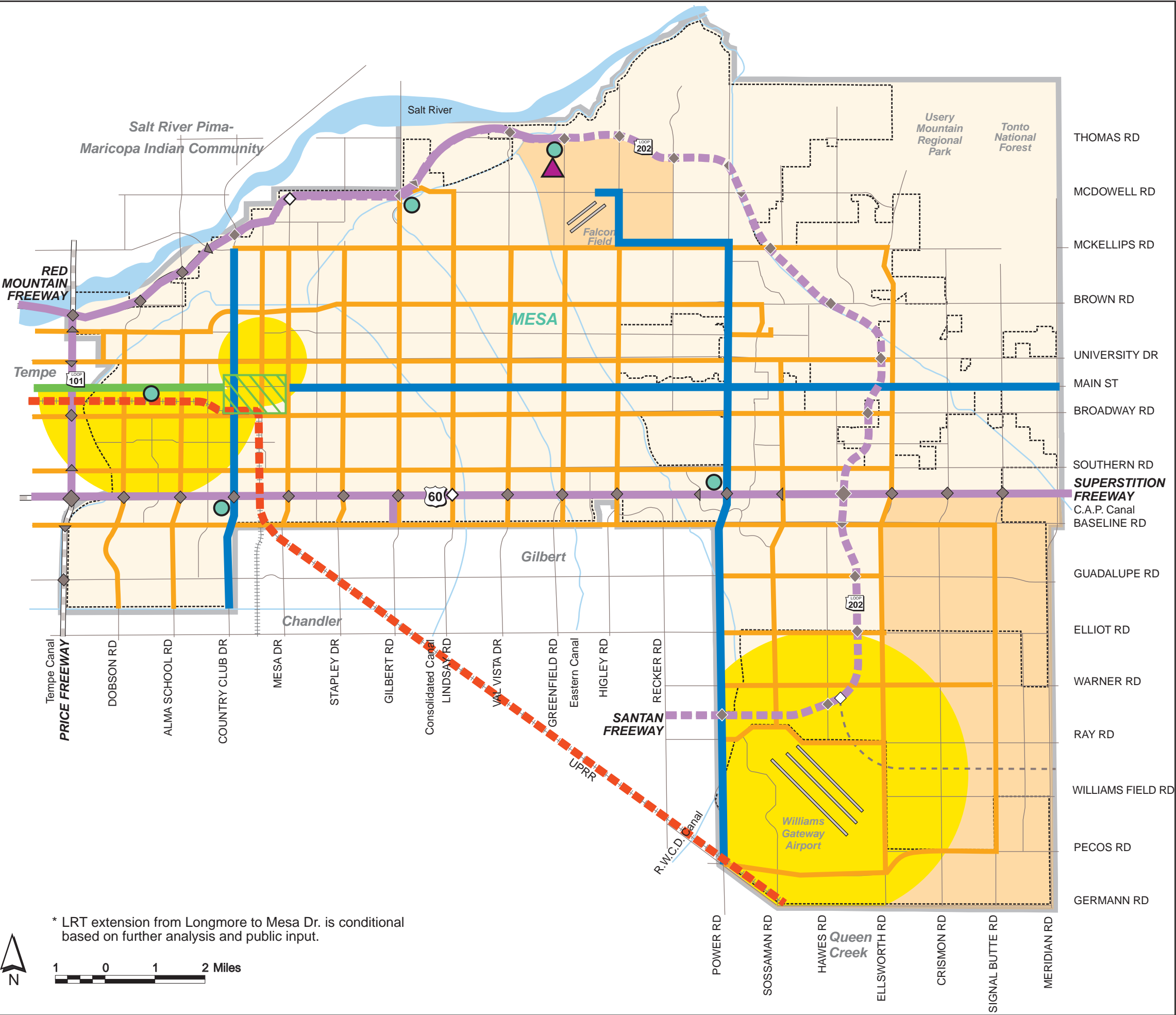
Transportation Plan



Recommended Transit Plan

Figure ES-3

- Local Bus
- Express Bus
- Light Rail Transit
- Town Center LRT Corridor*
- Transit Priority Corridor/BRT
- Circulator
- Future Regional Express Bus Service
- Future Commuter Rail
- Future Service Expansion (as demand warrants)
- Park-and-Ride
- Maintenance Facility
- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Bicycle Plan

The City of Mesa has been very successful in recent years in enhancing and expanding the bikeway system. Each year, new bicycle lanes are being striped on arterial streets, and additions are being made to shared-use paths along the canal system. The future system includes bicycle routes, bicycle lanes, shared-use paths as well as vital end-of-trip facilities.

To ensure that bicycling is a viable choice of travel, it is important to provide a bicycle system that offers a continuous, integrated network of routes, lanes, and shared-use paths spaced at no more than one mile apart. Small breaks in a bikeway tend to reduce overall use of the facility. Providing well-delineated space for cyclists approaching intersections helps improve continuity of the overall bicycle network.

Facilities are included in the future bicycle system that close gaps in the existing network, and provide connections with neighboring jurisdictions. In particular, the plan calls for the construction of 65 miles of shared-use paths along canal banks and freeway corridors, which will serve as vital links to the overall bicycle system.

A summary of the total miles of facilities that will be provided with the complete implementation of the plan is presented in Table ES-3, and the full bicycle plan is presented in Figure ES-4.

Table ES-3: Bicycle Plan Facilities

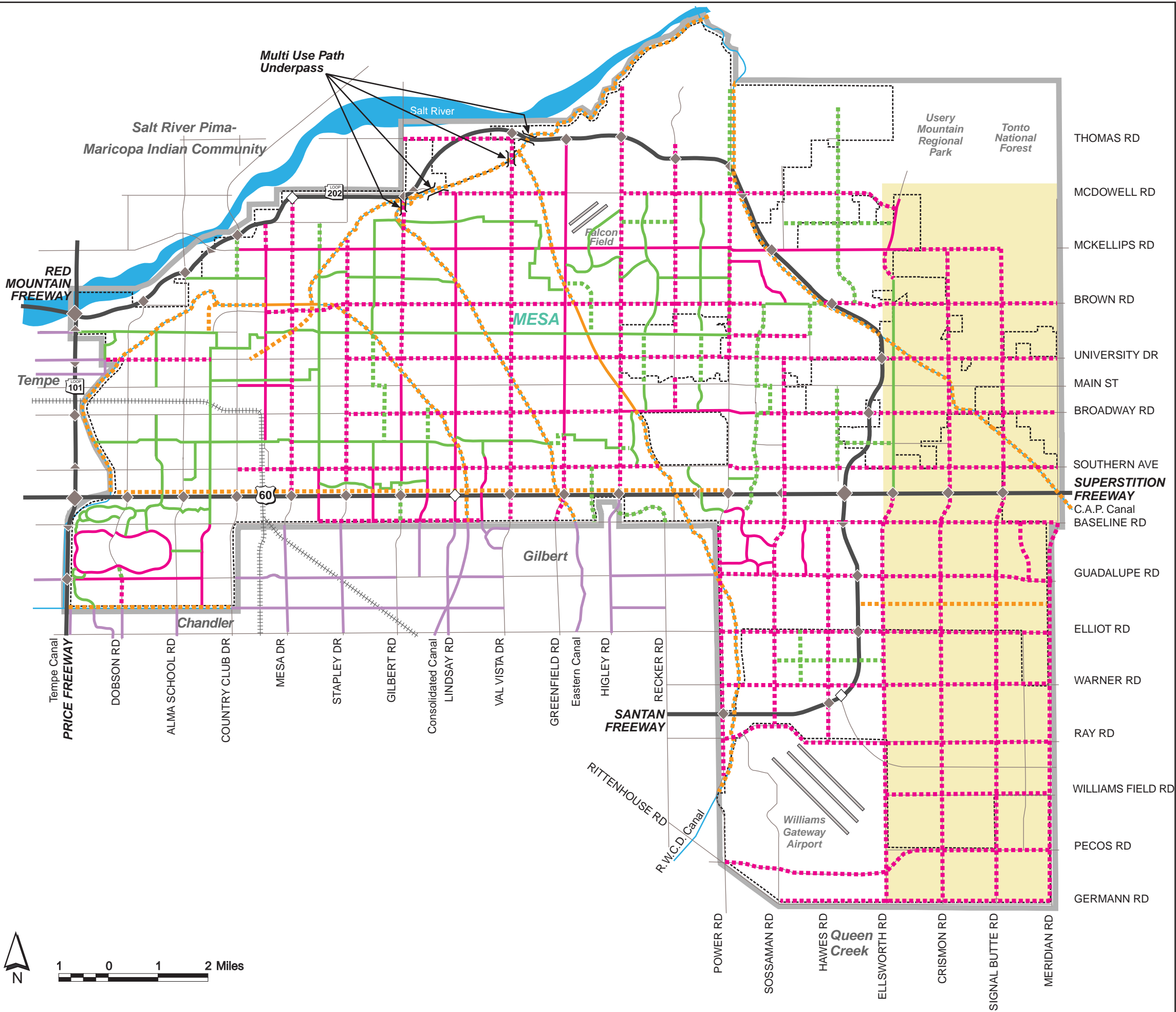
FACILITY TYPE	TOTAL MILES
Bike Routes	109
Bike Lanes	215
Shared Use Paths	65

Transportation Plan



Future Bicycle Facilities

Figure ES-4



- Developing Areas*
- Proposed Bike Route
- Proposed Bike Lane
- Proposed Shared Use Path
- Existing Bike Route
- Existing Bike Lane
- Existing Shared Use Path
- Other Jurisdiction's Routes
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways

*NOTE: Additional bicycle facilities will be added in developing areas to provide an inter-connected system.



Pedestrian Plan

The pedestrian plan provides an environment where walking is enjoyable and convenient for people of all ages. All trips have a pedestrian component. People must walk from their car to their destination or from their home to the bus stop and from the bus stop to their destination.

Recommendations for future pedestrian improvements focus on improving the accessibility and convenience of the overall pedestrian environment. This requires developing and implementing pedestrian-oriented design standards, both for capital roadway improvements and for the design of future development and redevelopment projects.

Pedestrian-oriented design embodies the notion that transportation and land use planning must be linked to provide a safe and convenient walking environment. The Plan allocates \$750,000 per year to fund an ongoing arterial landscaping program to enhance this component of the pedestrian environment.

TDM Plan

Travel demand management (TDM) can be defined as the application of various strategies to promote the more efficient use of existing transportation systems. TDM measures affect the demand side of transportation as opposed to the capacity. TDM programs are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel.

TDM strategies can be grouped into three categories.

- alternatives to the single occupant vehicle which include carpools, vanpools, and transit
- incentives and disincentives which can include parking fees, reduced parking supplies, and employer support of transit
- alternative work arrangements such as telecommuting and alternative work hours.

TDM can provide multiple benefits, including reduced traffic congestion, road and parking facility cost savings, user financial savings, increased road safety, increased travel choice, increased equity, reduced pollution, and energy savings. TDM includes strategies that increase the quantity of travel alternatives such as transit, ridesharing, walking, bicycling, and telecommuting; strategies that reduce the need for travel by creating more efficient land use; and strategies to reward consumers for using the travel option that is most cost effective overall. TDM strategies are a key component to the regional effort to improve the Valley's air quality. Because the valley is a non-attainment air quality area, major employers are required to implement trip reduction programs to help improve air quality.

Town Center Plan

The Town Center Plan has been developed to support the redevelopment of downtown and the implementation of the Town Center Concept. The Town Center Plan includes a number of transportation improvements to enhance the streetscape and pedestrian linkages in the Town Center and to improve transit service. The Town Center Plan includes a designation for traffic streets, pedestrian streets, and transit streets, which indicates a focus for that streets use, but does not exclude any mode.

Specifically, the street projects include Macdonald Street, Center Street, 1st Avenue, 1st Street, Hibbert Street, and 2nd Street. The pedestrian projects include a downtown cultural walk, and east-west and north-south pedestrian connections.

The estimated cost for the Town Center Plan is \$31.3 million.

Finance Plan

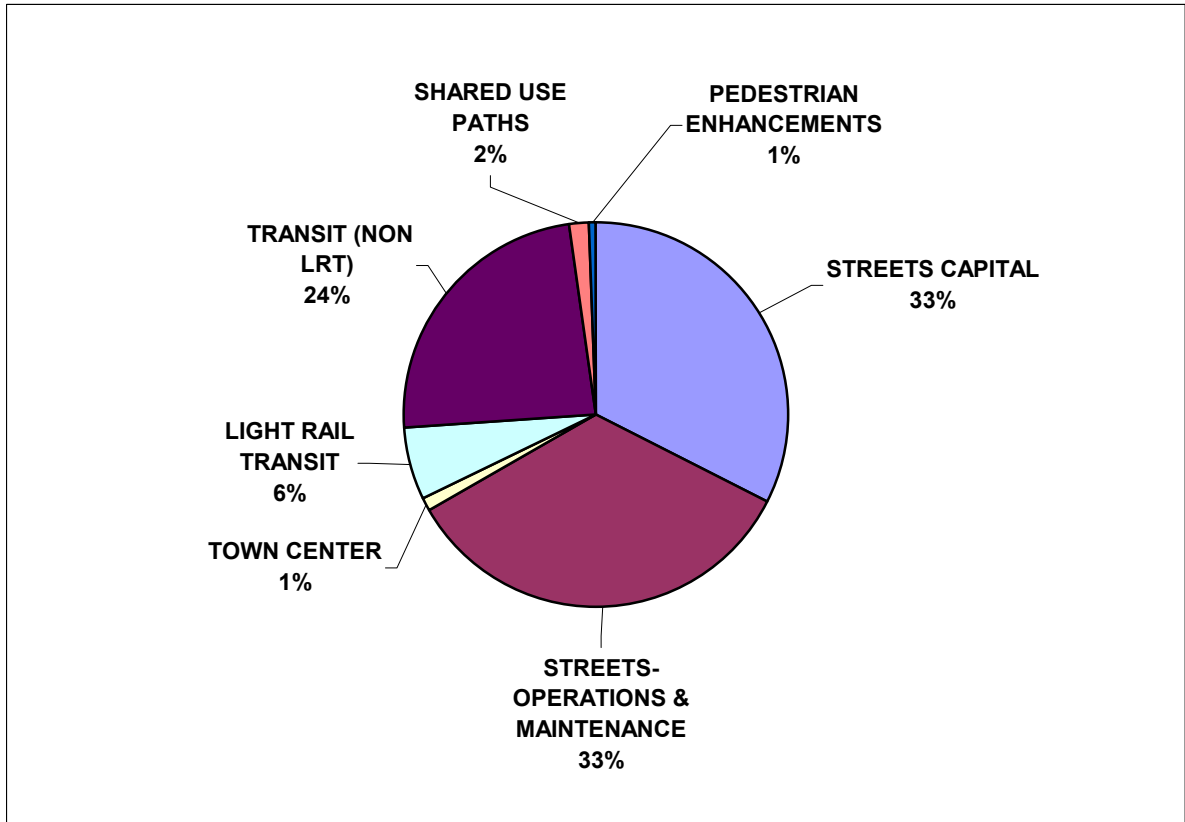
Given projected growth trends and budget constraints, it will be difficult to provide for our community's need to widen and extend city streets, expand the transit system, as well as improve bicycle and pedestrian facilities.

The finance plan includes a detailed evaluation of the estimated cost and projected revenue for the transportation system. The estimated cost in 2002 dollars to implement, operate, and maintain each of the plan components is \$2,902 million. The breakdown of transportation program costs are as follows:

PROGRAM	COST (2002\$)	% of Total
Streets		
Capital	\$943,670,000	32.5%
Operations & Maintenance	\$993,030,000	34.3%
Subtotal	\$1,936,700,000	67.8%
Transit		
Light Rail	\$175,285,000	6.0%
Other Transit	\$690,712,000	23.8%
Subtotal	\$865,997,000	29.8%
Town Center Plan	\$32,281,000	1.1%
Shared-Use Paths	\$48,750,000	1.7%
Pedestrian Enhancements	\$18,750,000	0.6%
TOTAL	\$2,902,478,000	100%

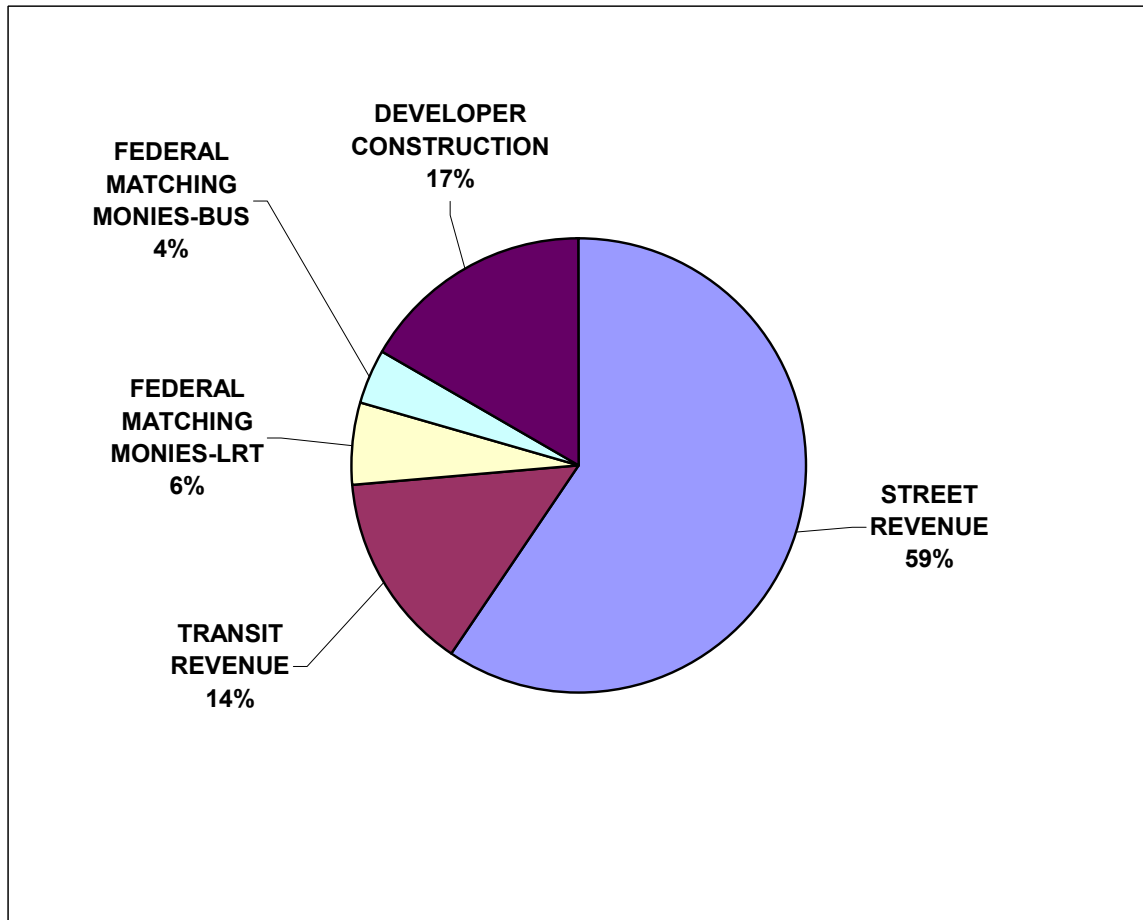
The allocation by program is presented graphically in Figure ES-5.

Figure ES-5 : Cost Allocation



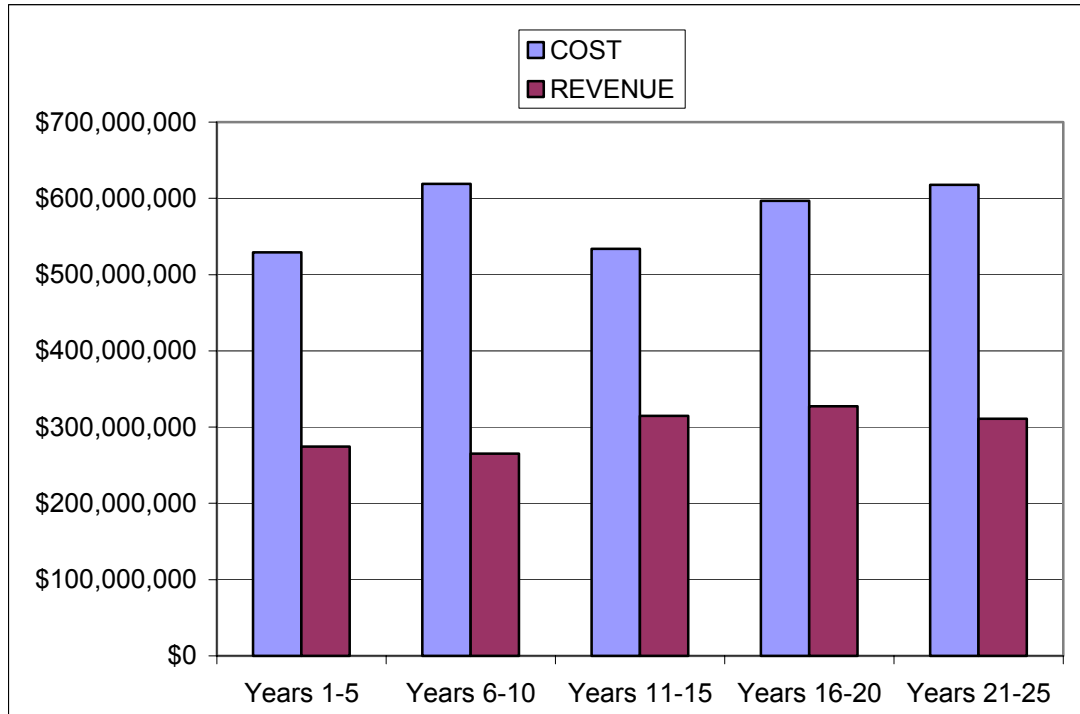
Similarly, transportation revenue was projected for a 25-year period assuming a continuation of current revenues. The estimated revenue in 2002 dollars by category is shown in Figure ES-6.

Figure ES-6: Revenue Sources



A comparison of the cost estimate and the revenue projection indicates a shortfall of \$1,377 million for the 25-year period. The cost-revenue comparison by five-year period is shown in Figure ES-7.

Figure ES-7: Cost-Revenue Comparison



Implementation

The implementation of the transportation plan is expected to occur in phases over the next 25 years. Actual implementation will depend on a number of factors including funding, cost sharing, joint projects, development patterns, and public input.

Additional revenue sources to offset the shortfall must be identified in order for the plan to be implemented. The most viable candidates for additional revenue sources are a sales tax addition and developer impact fees. No one source is likely to generate enough revenue to eliminate the shortfall. For example, if an additional ½ cent sales tax was implemented, approximately \$37.5 million per year or \$937.5 million in 2002 dollars would be generated over the life of the program.

It is important for the City to initiate the process to investigate additional funding options and prioritize projects. One option that has worked successfully in other communities is for the City Council to appoint a citizen committee to address these challenges.

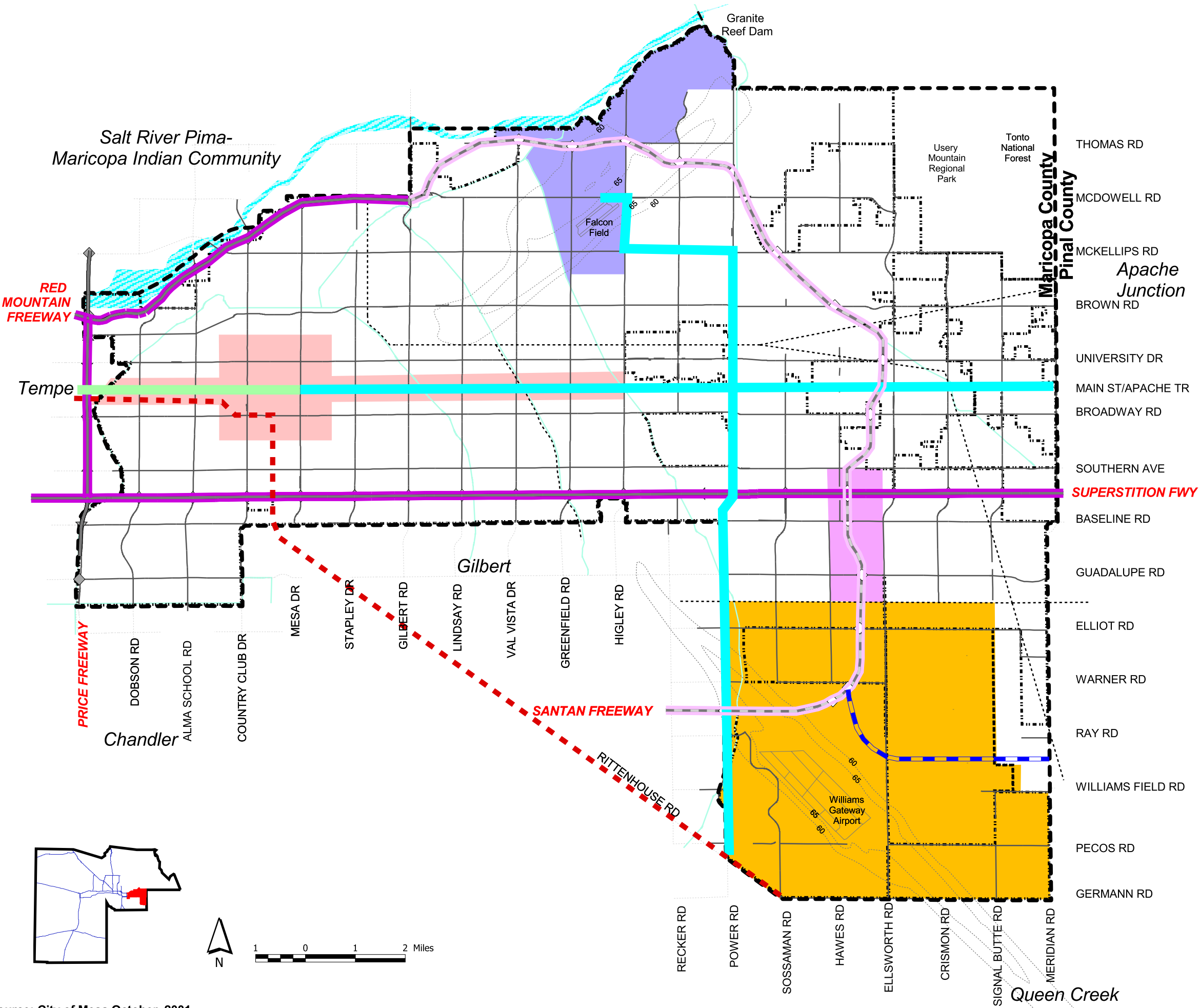
Local transportation funds will provide a significant advantage to the City in leveraging federal, state, and regional transportation dollars.

Ultimately, Mesa will have the multi-modal system needed to provide residents with travel options. A balanced transportation system will be an integral part of creating sustainable development in Mesa. Figure ES-6 shows the transportation linkages that have been provided in the plan to serve activity centers, to guide the development of economic centers and to help maintain a vibrant community that establishes Mesa as a desirable community.

Transportation Plan

Major Transportation Linkages

Figure ES-8



Source: City of Mesa October, 2001.



1.0 INTRODUCTION



Imagine a high quality, people-friendly, multi-modal transportation system that provides unlimited opportunities to live, work, and play in the City of Mesa. Imagine a system that provides viable choices for travel to promote and sustain a strong urban city.

IMAGINE . . .

- . . . People boarding a bus to shop at the regional mall.
- . . . Children riding their bicycles to the neighborhood park.
- . . . Commuters walking to the LRT station to take the train to work.
- . . . People driving to the grocery store.
- . . . People walking from the transit center to the arts and entertainment center.
- . . . Joggers and walkers together on a shared-use path.
- . . . Fans on a bus, train, or in their car to attend a local sporting event.

Imagine if the components of this plan are implemented, then Mesa will become such a city, with a transportation system that connects modes, serves activity centers, provides excellent mobility, and is accessible to all users. In order to achieve such a plan, the city initiated a comprehensive process known as Mesa 2025-A Shared Vision. The process supported the development of the Transportation Plan, the General Plan, an Economic Development Plan, and a Parks and Recreation Plan.

A citizens' advisory committee known as the Joint Master Planning Committee (JMPC) guided the process. One of the functions of the committee was to develop a future vision for Mesa and establish connectivity between the four plans. The JMPC met regularly during the study to discuss transportation, land use, parks and recreation, and economic development and the role each component plays in achieving the city's vision. The process included numerous public meetings, interviews with elected officials and community leaders, and community surveys. The culmination of the process is four plans that will guide the continued growth of Mesa.

The Mesa 2025-A Shared Vision process identified the importance that transportation plays in the development and growth of Mesa. Sustainable development needs a balanced transportation system to serve the users. More importantly, a multi-modal system provides options for users and helps to maintain a vibrant community that establishes Mesa as a desirable city.

The Mesa 2025-A Shared Vision process developed a land use plan that allows continued growth for the city. Specifically, when the planned land uses are fully developed, the population is expected to increase 50 percent, and the employment is expected to more than double. This growth can either be a burden on the transportation system or it can be integrated with transportation. The land use plan and transportation plan can work in unison to support and guide development that encourages all transportation modes in their design. The goal of this plan is to have growth and transportation compliment each other.

The development of a multi-modal transportation plan needs to consider a number of factors to meet the vision and goals of the plan. Specifically, the following should be considered.

- **Safety** - All areas of design, operations, and maintenance of the transportation system should minimize hazards and emphasize safety for all modes of travel. Special consideration should be given to minimizing conflicts between travel modes.
- **Efficiency** - Transportation systems must be well-designed to effectively serve adjacent land uses. The degree to which each mode meets the needs of the community should be considered in terms of efficiency.
- **Balance** - A balanced transportation system provides multiple choices that are convenient and accessible for travelers. Balance is important to meet the diverse travel needs of a large community like Mesa.
- **Integration** - It is important to integrate travel modes that facilitate the transfer from one mode to the next. Many trips involve using more than one mode. People who drive to work walk from their car to the office, and others ride their bike to a transit stop, and finish the trip on the bus. A multi-modal system provides convenient, easy access between travel modes.
- **Mobility** - Mobility is a measure of a person's ability to travel to destinations within a community. A balanced transportation system provides the ability to choose a travel mode

based on the type and distance of a trip. In an auto dependent community, travelers are usually forced to drive, even when the trip is short, and could be made more efficiently by another mode (e.g., walking to the store for a quart of milk).

- **Accessibility** - Accessibility is a measure of the degree to which travelers can use various modes in the transportation system. Accessible transportation systems provide ease of use for all people, regardless of physical ability or economic status.
- **Aesthetics** - Forms a uniqueness of the area and creates a theme that invites people to use the system and includes facility design, landscaping, and art.

The 2025 Mesa Transportation Plan is the first multi-modal plan prepared by the City of Mesa. The components of the transportation system included in this plan will encourage transit and pedestrian oriented development while maintaining a strong street system. These features will establish Mesa as a modern urban city with strong economic centers, creative development opportunities, state-of-the-art parks and recreation facilities that signify Mesa as a desirable place to live, work, and play.

The transportation plan establishes long range plans for streets, public transportation, bicycles, pedestrians, the Town Center, and transportation demand management (TDM). The street system will continue to provide the backbone of the transportation system and support the other modes. Bus, bicycle, and pedestrian facilities will be incorporated into the street system design. Bus pullouts will be provided at major intersections, bike lanes and routes will be included on much of the street system, and sidewalks will be an integral part of the street cross section.

The public transportation system will be greatly expanded. The bus system will provide extended service hours and weekend service, new local and express routes will be added, and local circulators will be introduced in areas of concentrated employment and retail activity. Several transit priority corridors have been defined. Compared to local bus service, these are intended to provide a higher level of service by providing bus only lanes on arterial streets. Light rail transit will be provided on Main Street from the west city limit to just west of Mesa Drive and will link Mesa with Tempe and Phoenix.

The bicycle plan includes bike lanes and routes on most of the arterial and collector streets, and shared use paths along the canals, US 60, and the transmission power line easement in southeast Mesa. The paths would be developed in conjunction with the Parks and Recreation Division and would include amenities to support bicycle travel.

The pedestrian plan defines development standards and criteria to encourage pedestrian oriented development (POD) and provides additional funding for landscape features along walkways.

The Town Center Transportation Plan builds on the Town Center Concept Plan, which was recently prepared. The focus of the transportation system is the extension of the LRT into downtown. Also included is a transit center at Main and Hibbert, which will support the connectivity of all transportation modes. To ensure that all modes are provided for in the Town Center, the plan defines the primary function of certain streets in the downtown as traffic oriented, pedestrian oriented, or transit oriented.

Key Issues

A number of key issues were identified during the study process from interviews with community leaders, public workshops, Joint Master Plan Committee meetings, and the community survey. These key issues, which are summarized below, were instrumental in developing the goals, objectives, and policies and in formulating the components of the transportation system.

- Create a balanced transportation system
- Construct street widening and intersection improvements
- Manage traffic congestion
- Complete the freeway system
- Improve mass transit
- Consider the inter-relationship between land use and transportation
- Address the needs of bicyclists and pedestrians
- Coordinate with surrounding communities
- Provide transportation funding for adequate maintenance and operations
- Provide transportation funding for capital projects
- Improve air quality

Format of the Plan

The format of the plan is described below. After this background information, there is a description of the study area followed by the goals, policies, and objectives that formed the framework of the transportation plan. Chapter 2 presents a summary of the public involvement program and activities that supported Mesa 2025-A Shared Vision. Chapter 3 includes a summary of the existing and future conditions and the regional setting for the plan. Chapters 4-9 present the plans for each of the modes and components of the transportation system, which are listed below.

- Street plan
- Public transportation plan
- Bicycle plan
- Pedestrian plan
- Transportation demand management plan

- Town Center transportation plan

Each of these plans include a summary of the existing conditions, a discussion of future needs, and a description of the plan and priorities to address the needs.

Chapter 10 is the finance plan, which describes existing funding sources for transportation, presents the cost for each of the plans and discusses potential new funding sources to address the funding deficit. Chapter 11 presents the implementation plan, which combines all the transportation needs including projects, need for additional study, and administrative actions desirable to establish a functional multi-modal transportation system.

Study Area

The study area, which is known as the planning area, is larger than the City's incorporated limits as shown in Figure 1-1. This increased area accounts for the fact that the City of Mesa's sphere of influence extends beyond its boundaries, particularly into areas that currently are primarily under the jurisdiction of Maricopa County. The planning area is generally bounded by the Salt River on the north, Baseline Road to Power Road to Germann Road on the south, the Loop 101 Freeway on the west, and Meridian Road on the east. The City's incorporated area covers 128 square miles. Unincorporated areas collectively comprise approximately 44 square miles, creating a total planning area of nearly 172 square miles.

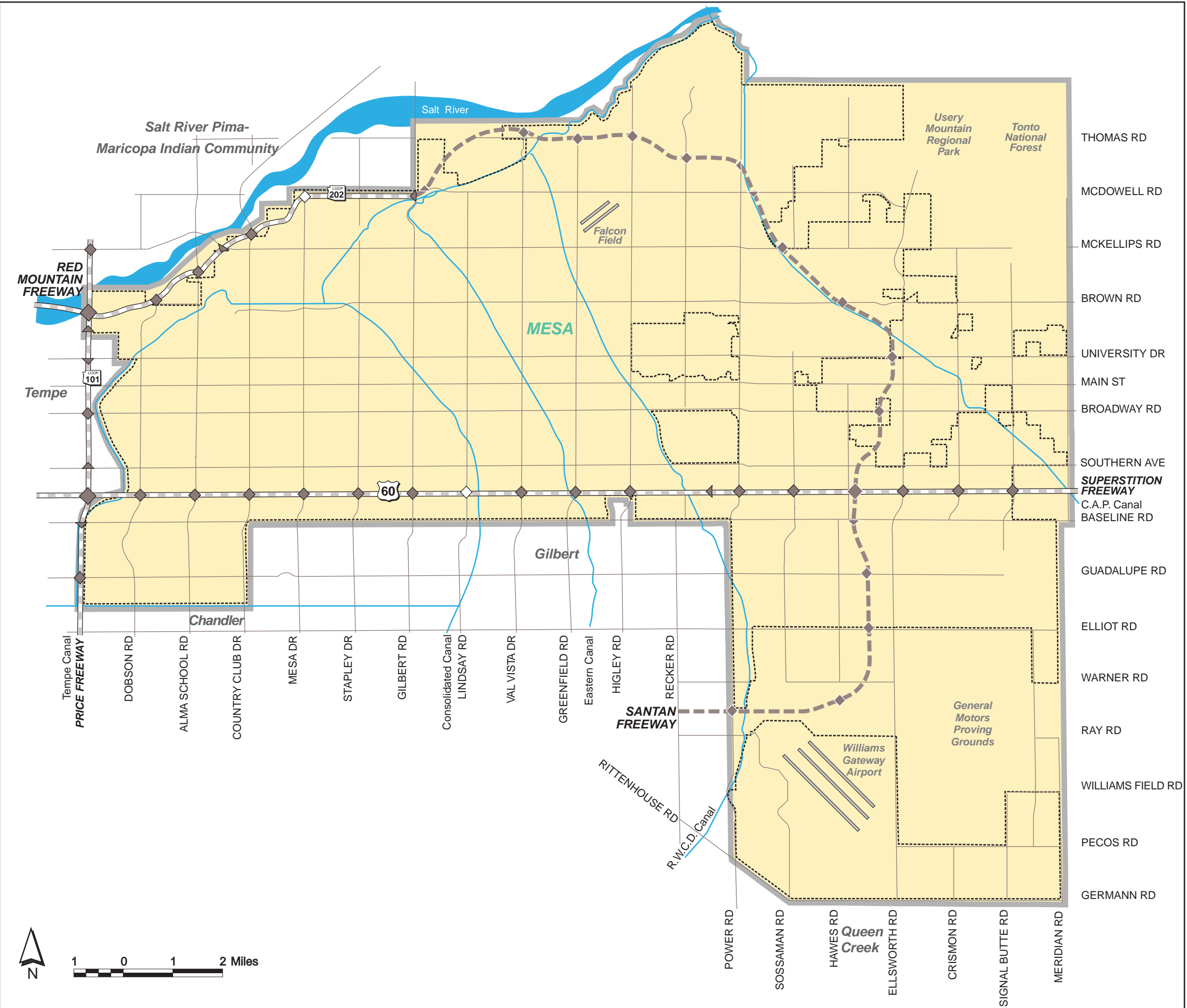
Transportation Plan



Study Area

Figure 1-1

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Plan Goals, Objectives, and Policies

The purpose of goals, objectives, and policies is to outline the framework for developing and implementing the transportation plan in a manner that achieves the overall vision for transportation. Specifically, goals are statements concerning desirable long-range achievements. These goal statements are general in nature and describe the ideal future situation. Objectives are intermediate milestones that are essential to achieve the goals. They are expressed in terms that are measurable and achievable. Several objectives may apply to each goal. Policies are approved courses of action to be followed. These policies describe the actions that are needed to achieve the objectives.

The development of the goals, objectives, and policies objectives was an iterative process. An initial set of goals was developed based on the circulation element of the 1996 General Plan supplemented by goals from other transportation plans. This initial list was reviewed with the JMPC transportation sub-committee and refined to the five goals presented here. With the goals defined, objectives and policies that support the goals and the transportation vision were formulated.

As staff and city council work to implement the policies presented here, the objectives will be achieved, the goals will be met, and the vision for the transportation system will be realized.

GOAL T-1: *Provide a balanced, multi-modal transportation system for the City of Mesa that supports the safe and efficient movement of people and goods.*

Objective T-1.1 Provide viable options for the movement of people and goods.

- Policy T-1.1a Implement strategies to manage congestion.
- Policy T-1.1b Enhance the safety of all current and future travel modes.
- Policy T-1.1c Balance mobility and accessibility needs among travel modes.
- Policy T-1.1d Establish performance standards for all modes.
- Policy T-1.1e Encourage the development and implementation of new technologies for traffic control, traffic information systems, public transit, and goods movement.
- Policy T-1.1f Support the planning and development of a balanced, multi-modal transportation system that provides equal convenience and accessibility for all modes of travel.

Objective T-1.2 Design and build a roadway system for the future (2025 and beyond) that learns from and builds on the past.

- Policy T-1.2a Coordinate with ADOT to complete the freeway system.
- Policy T-1.2b Ensure that the freeways do not create barriers to other modes of transportation and that the designs provide crossings for pedestrian and bicycle travel. In addition, the potential for facilities that parallel the freeways for bikes and trails should be evaluated.
- Policy T-1.2c Develop and maintain a roadway network consistent with the Roadway Functional Classification Map presented in this Plan.
- Policy T-1.2d Develop the roadway network consistent with the right-of-way requirements and typical street sections contained in the current version of the Mesa Standard Details.
- Policy T-1.2e Continue the ongoing street widening and improvement programs based on current needs and level of service with a focus on those that provide direct freeway access.
- Policy T-1.2f Continue to develop and maintain state-of-the-art traffic signal equipment to provide the best possible traffic flow.
- Policy T-1.2g Support the efforts of the regional trip reduction program to reduce single-occupant commuter trips to major and intermediate employment sites.

Objective T-1.3 Improve accessibility, availability, efficiency, and viability of public transportation for all users.

- Policy T-1.3a Provide a dedicated funding source for public transportation services to ensure dependable ongoing mobility options for Mesa citizens.
- Policy T-1.3b Continue to provide a variety of paratransit services, which primarily serves the elderly and the disabled.
- Policy T-1.3c Support the efforts of the Regional Public Transportation Authority (RPTA) to expand bus service and to establish light rail transit (LRT) service in the East Valley that includes a major hub in Town Center.
- Policy T-1.3d Continue the concept of a grid network local bus system with connections to express bus service and regional transit service.
- Policy T-1.3e Develop transit/HOV passenger transfer facilities and park-and-ride lots as needed to make transit ridership safe, comfortable, and convenient.
- Policy T-1.3f Develop local bus circulators to provide better connectivity between neighborhoods and activity centers within the City of Mesa.
- Policy T-1.3g Coordinate with Valley cities and regional agencies to explore applicability of congestion pricing, including HOT lanes.
- Policy T-1.3h Support efforts to study high capacity transit including commuter rail.

Objective T-1.4 Create a comprehensive system of bicycle facilities, programs, and services.

- Policy T-1.4a Accommodate bicyclists on street rights-of-way consistent with the type of street, potential demand for cycling, safety, and the bicycle facility map contained in this Plan.
- Policy T-1.4b Develop an interconnected network of shared-use paths along canal banks, utility easements, and roadway rights-of-way to link open spaces, parks, recreational facilities, and schools throughout the City and into adjacent jurisdictions.
- Policy T-1.4c Encourage employers to provide bicycle lockers and shower facilities for employees who cycle to work.
- Policy T-1.4d Develop bicycle parking standards for new development and redevelopment projects.
- Policy T-1.4e Provide an interconnected system of half-mile collector streets to ensure continuity of biking and walking routes.
- Policy T-1.4f Use nationally and regionally recognized standards and guidelines for the planning, design, and construction of bicycle facilities.

Objective T-1.5 Create an efficient, inviting environment for pedestrians.

- Policy T-1.5a Adopt design standards and codes that improve the pedestrian environment. In developing pedestrian standards, consider nationally recognized studies, Pedestrian Area Policies and Design Guidelines prepared by the Maricopa Association of Governments (MAG), and the RPTA Pedestrian-Oriented Development Guidelines.
- Policy T-1.5b Encourage pedestrian use and safety by providing sidewalks that are detached from roadways, along with appropriate landscaping and shade. Require shelters, awnings, trees, and benches on sidewalks in designated pedestrian areas.
- Policy T-1.5c Develop multi-use pathways along the canals and in parks to improve pedestrian circulation.
- Policy T-1.5d Maintain easy and inviting pedestrian access from commercial and residential developments to transit connections.
- Policy T-1.5e Provide direct and convenient pedestrian connections. Meandering sidewalks shall be discouraged.

Objective T-1.6 Create a transportation system that is accessible to all users.

- Policy T-1.6a Consider the needs of the entire community and the special needs of the elderly and people with impaired mobility in the planning and design of the transportation system.
- Policy T-1.6b Design transportation facilities to be in conformance with standards established in the Americans with Disabilities Act.
- Policy T-1.6c Enhance inter-modal access for individuals with impaired mobility. Ensure that people with disabilities are provided equal access to work, home, and community destinations.

Objective T-1.7 Ensure existing elements of the multi-modal transportation system are conserved through adequate maintenance and preservation.

- Policy T-1.7a Monitor the condition of all transportation facilities including roads, buses, and bike facilities, to nationally accepted maintenance levels.

GOAL T-2: *Develop a plan that builds on the character of the city, is sensitive to the environment, and enhances the quality of life today and in the future.*

Objective T-2.1 Provide a transportation system that minimizes air, water, and noise pollution while maintaining and enhancing the environment.

- Policy T-2.1a Support the development of innovative travel modes and fuel sources to reduce single-occupant vehicles, vehicle miles traveled, and reliance on fossil fuels.
- Policy T-2.1b Monitor and evaluate the development of zero-emission technology for conversion of City vehicles.

Objective T-2.2 Assist in achieving and maintaining health-related air quality standards throughout the region.

- Policy T-2.2a Continue to work with the regional air quality planning agency to reduce the levels of air pollution that are attributable to the transportation system.
- Policy T-2.2b In accordance with the Federal Clean Air Act, require that all regionally significant transportation projects undertaken by the City of Mesa meet specified air quality conformity criteria.
- Policy T-2.2c Support and participate in the Maricopa Association of Governments Clean Cities program.
- Policy T-2.2d Secure funding to pave dirt streets and treat alleyways to improve air quality.

Objective T-2.3 Establish guidelines and standards to enhance the land use/transportation connection.

- Policy T-2.3a Develop guidelines to encourage pedestrian and transit-oriented development and revitalization.
- Policy T-2.3b Discourage or restrict cut-through vehicular traffic through residential neighborhoods while maintaining pedestrian and bicycle access.
- Policy T-2.3c Encourage the location of higher density land uses in activity centers where a variety of transportation options can be provided.
- Policy T-2.3d Support the integration of transportation and land use planning processes and programs.
- Policy T-2.3e Locate greater residential densities near major employment centers to reduce travel demand and to maintain air quality.
- Policy T-2.3f Locate a broad mix of housing options close to employment centers to reduce home to work trip lengths.
- Policy T-2.3g Discourage the development of new strip commercial areas and focus future activity in such areas to create a more clustered pattern of commercial development that minimizes trips.
- Policy T-2.3h Encourage infill and redevelopment to accommodate a portion of expected growth and to utilize existing transportation infrastructure.
- Policy T-2.3i Encourage mixed-use development where such areas act as buffers and where opportunities exist for the creation of activity centers.

Objective T-2.4 Maintain and enhance neighborhood integrity and identity when planning, designing, and constructing transportation improvements.

- Policy T-2.4a Provide connection between neighborhoods, schools, parks, and areas of the City without using arterial streets.
- Policy T-2.4b Minimize physical barriers between neighborhoods and subdivisions, such as fences and walls.
- Policy T-2.4c Design new local and collector streets to reduce travel speeds and cut through traffic in neighborhoods.
- Policy T-2.4d Provide for appropriate traffic calming measures to address speeding and cut through traffic in neighborhoods.

Objective T-2.5 Develop transportation facilities that are compatible with the natural desert landscape and open space.

- Policy T-2.5a Establish guidelines related to the visual appearance (aesthetics) of transportation facilities and to the incorporation of public art in transportation projects that give identity to neighborhoods.

GOAL T-3: *Provide an open, objective, and credible process for planning and developing a transportation system that complies with state and federal regulations and is responsive to the community.*

Objective T-3.1 **Involve citizens in planning the transportation system – ensuring plans address public values and have the flexibility to respond to changing needs.**

Policy T-3.1a Maintain a website with information on transportation projects and meetings.

Policy T-3.1b Seek citizen input on transportation issues, projects, and programs.

Policy T-3.1c Identify ways to obtain public input on transportation priorities in preparing the Five-Year Capital Improvement Program.

Objective T-3.2 **Educate and involve the public and policy makers in developing our transportation system – including changing how we, as a community, travel.**

Policy T-3.2a Develop transportation related information and educational programs for distribution to the public.

Policy T-3.2b Establish a presence at City-sponsored events.

Policy T-3.2c Provide adequate resources to support a transportation safety education program.

Policy T-3.2d Begin an active marketing program for the use of alternate modes.

Objective T-3.3 **Coordinate the planning for the existing and future transportation system with adjacent communities and regional agencies.**

Policy T-3.3a Coordinate long-range transportation planning activities by participating in the MPO planning. Coordinate transportation facilities and improvements with development activities, both public and private, and with regional transportation and land use plans.

Policy T-3.3b Coordinate with affected state and federal agencies, local governments, special districts, and providers of transportation services to ensure the timely provision of required projects, programs, and services.

Policy T-3.3c Coordinate with adjacent jurisdictions to ensure consistent planning and network continuity at the City's boundaries for all modes of travel.

Objective T-3.4 Utilize the Transportation Plan as the foundation for decision making in transportation related issues.

- Policy T-3.4a Provide policy direction for elected officials, advisory bodies, and staff in transportation issues.
- Policy T-3.4b Develop and periodically update a Transportation Plan.
- Policy T-3.4c The purpose of the Transportation Plan is:
- Review and revise existing transportation design standards;
 - Require new development to provide its fair share of transportation right-of-way and infrastructure;
 - Identify measures and programs to enhance mobility for all travel modes;
 - Prioritize projects in the Five-Year Capital Improvement Program; and
 - Establish funding and project construction priorities.

GOAL T-4: *Develop a plan that can be funded and that reflects responsible use of public funds.*

Objective T-4.1 Develop innovative and sound funding policies to implement the Plan.

- Policy T-4.1a Continue to pursue additional outside funding sources.
- Policy T-4.1b Develop policies that support private investment in the development of high-tech infrastructure.
- Policy T-4.1c Ensure that the costs of planned improvements are commensurate with the benefits.
- Policy T-4.1d Establish the operations and maintenance of the existing transportation system as a priority for funding before investing in new infrastructure.
- Policy T-4.1e Establish a dedicated funding source to plan, design, operate, and maintain the transportation system.

Objective T-4.2 Establish funding priorities to guide the timing and sequencing of transportation improvements.

- Policy T-4.2a Continue to evaluate the transportation system in keeping with current needs and desires of the public.
- Policy T-4.2b Conduct an annual review of transportation projects to validate priorities.
- Policy T-4.2c Provide for ongoing funding for streets dedicated to long-term maintenance and reconstruction of the City's transportation facilities.

Objective T-4.3 Ensure that new growth and development projects pay for their fair share of transportation infrastructure costs.

- Policy T-4.3a To address access and roadway needs for all proposed new developments, the City may require a Traffic Impact Analysis. Cost and responsibility of needed transportation improvements should be identified.
- Policy T-4.3b Establish a Traffic Impact Fee program.
- Policy T-4.3c Support legislation to allow for the creation of a street utility fee.

GOAL T-5: *Provide a transportation system to support planned economic development and vitality.*

Objective T-5.1 Support desired economic development and tourism.

- Policy T-5.1a Provide a balanced transportation system to support the economic viability of the City.
- Policy T-5.1b Provide gateway treatments along transportation corridors at the City's boundaries to highlight the entrance to Mesa.
- Policy T-5.1c Provide specialized signage as needed in activity centers such as downtown to direct tourists to sites and parking areas.

Objective T-5.2 Provide for goods movement.

- Policy T-5.2a Design arterial streets to accommodate freight traffic.
- Policy T-5.2b Provide transportation infrastructure for the movement of goods and freight via automobile, truck, rail, air, fiber optics, or pipeline.

Objective T-5.3 Provide a high quality transportation system to preserve and enhance the value to the community of Falcon Field and Williams Gateway Airport.

- Policy T-5.3a Promote and encourage improved access to Williams Gateway Airport and Falcon Field.
- Policy T-5.3b Consider alternatives for funding of the primary roadway system, particularly those segments that provide access to Williams Gateway Airport.

2.0 PUBLIC INVOLVEMENT



An extensive public involvement program to solicit citizen input was conducted as part of the preparation of the General Plan, Transportation Plan, Parks and Recreation Plan, and Economic Development Plan. The program included a citizens advisory committee, public open houses, surveys, interviews with elected officials, community leaders, and key staff, preparation of newsletters, and a web site.

The major objectives of the process were:

- To ensure that the general public and public interest groups were informed about the planning process and had opportunities to participate.
- To maintain communication with the general public.
- To ensure that all potential issues were identified and evaluated.
- To communicate with the City Council and City advisory bodies.

Joint Master Planning Committee

The Mayor and City Council appointed a 31-member citizen committee, known as the Joint Master Planning Committee (JMPC), to provide general guidance in the preparation of the General Plan, Transportation Plan, Parks and Recreation Plan, and Economic Development Plan. This Joint Master Planning Committee considered broad policy issues, provided input to the public involvement process, and made recommendations to the City Council.

Subcommittees were created for each of the four plans. The transportation subcommittee also included members of the City's Transportation Advisory Board (TAB). The subcommittee reviewed and commented on interim products during the study and forwarded its findings and recommendations to the full JMPC. The subcommittee was directly involved in the decision making process for each of the plan components. In addition, there were several joint meetings with the JMPC subcommittee and TAB at critical stages in the process.

Public Meetings

A series of three public open houses was held in each of the six City Council districts to present information to the citizens and to gather input during the three phases of the planning process. The three phases were: 1) documentation of existing conditions; 2) evaluation of alternatives; and 3) preparation of the draft plan. Each meeting included information displays, a summary of the information presented, and comment forms for the public to complete.

Citizen Survey

As part of the planning process, several citizen surveys were conducted in the spring of 2001. Specifically, there was a citizen survey regarding parks and recreation, a citizen survey on the General Plan and transportation, and a business survey. The results of these surveys are documented in a report titled "Mesa 2025-A Shared Vision, Citizen Survey Results" dated April 2001. Selected results of the General Plan and Transportation Survey are highlighted next.

- 87% of the respondents drive alone to work, school, or other frequent trips
- More than half were at least somewhat satisfied with ease of travel on the arterial streets
- 26% were satisfied with ease of access to public transportation
- Nearly all the respondents believe the City streets and freeways are somewhat congested during the morning and evening peak periods
- 55% were at least somewhat supportive of funding increases for public transportation
- Nearly three-quarters of the respondents were somewhat supportive of linking downtown Mesa to Phoenix with light rail
- 51% said light rail should eventually be extended to Williams Gateway Airport
- The top five priorities for transportation improvements:
 1. Widen freeways
 2. Widen major intersections
 3. Widen major streets
 4. Build another freeway loop
 5. Improve public transportation

Selected results of the business survey are highlighted below.

- 66% were at least somewhat supportive of funding increases for public transportation
- 64% were somewhat supportive of linking downtown Mesa to Phoenix with light rail
- The top five priorities for transportation improvements:
 1. Widen freeways
 2. Build another freeway loop
 3. Widen major streets
 4. Develop good pedestrian walkways
 5. Widen major intersections

3.0 EXISTING AND FUTURE CONDITIONS



Regional Growth

Maricopa County continues to experience rapid growth. According to the 2000 census, the population of the Phoenix-Mesa Metropolitan Statistical Area (MSA) exceeded 3 million people, an increase of 45 percent from 1990. This was the second highest growth rate in the country. MAG is currently updating their regional plan and looking at buildout growth scenarios that range from 6.5 million to 11 million people. Additional burden is placed on the transportation system, because vehicle-miles of travel continue to increase at a faster rate than population growth.

The number of persons employed in Maricopa County increased from 1.2 million in 1990 to 1.7 million in 1997 or approximately 42 percent. The number of private sector jobs increased 37 percent between 1992 and 1997 and the number of high-tech jobs increased 62 percent.

Local Growth

Growth in the City of Mesa is expected to parallel that of the county. The horizon year for the Mesa Transportation Plan is 2025. However, it can be considered a buildout scenario since the

socioeconomic data developed to generate the traffic forecasts is based on the full build out of the Mesa Planning Area according to the General Plan.

The estimated 2000 resident population for the Mesa planning area is 436,558 people and the estimated 2000 employment is 164,900 employees. This equates to an employment to population ratio of 0.38, which is below the county ratio of approximately 0.50.

Population and employment projections used in the MAG travel-forecasting model to prepare the transportation plan are based on the 2025 land use plan developed as part of the General Plan update. The 2025 land use plan includes 636,000 population and 358,000 employment for an employment to population ratio of 0.56.

In addition, Mesa will be influenced by growth in adjacent areas of Pinal County. Long range plans for northern Pinal County indicate there could be more than 100,000 new homes built in the area immediately south of the Mesa Planning Area.

Transportation Facilities

The number of vehicle trips per day in Maricopa County is expected to increase 140% or 31 million trips by 2040 (MAG Regional Transportation Plan Update Issue Paper, June 2001). This section describes existing regional transportation facilities and planned improvements to those facilities to help accommodate the increase in travel demand.

Freeway System

The Red Mountain Freeway, which opened to Gilbert Road in early 2002, will continue along the Thomas Road alignment and then turn southeasterly near Power Road and connect with US 60 between Hawes Road and Ellsworth Road. There will be a freeway-to-freeway system interchange at this location. Additional planned interchanges include a half interchange at McDowell Road just east of Gilbert Road, full interchanges at Val Vista Drive, Greenfield Road, Higley Road, and Recker Road, a half interchange at Power Road and McDowell Road, and full interchanges at McKellips Road, Brown Road, University Drive, and Broadway Road. A possible future interchange has been proposed at Mesa Drive. The Santan Freeway enters Mesa from the west between Warner Road and Ray Road and turns northeasterly near Hawes Road to connect with the system interchange at US 60. Additional interchanges will be provided at Power Road, Hawes Road, Elliot Road, Guadalupe Road, and a half interchange at Baseline Road. The opening for the various sections of Loop 202 is as follows:

Red Mountain Freeway

Gilbert Road to Higley Road – December 2002

Higley Road to Power Road – June 2005

Power Road to University Drive – March 2007

University Drive to US 60 – September 2007

US 60 to Baseline – December 2005

Santan Freeway

Baseline Road to Elliot Road – December 2005

Elliot Road to Power Road – June 2006

Light Rail Transit

Light rail transit (LRT) is electrically powered, high capacity transit service operating on a fixed guideway. It operates all-day on two sets of tracks with trains of up to three cars traveling in



both directions. LRT typically runs 18 to 20 hours per day and stops at stations located approximately every mile. A 20.3-mile starter segment of the new Central Phoenix/East Valley Light Rail Transit Project will begin operating in late 2006. The starter segment will run from Phoenix, through downtown Tempe, and into Mesa where it will terminate near Main Street and Longmore.

The mid-term transit plan recommends LRT be extended east along Main Street from Longmore to Mesa Town Center. The long-term transit plan recommends LRT service in Mesa increase frequency from 10 minutes in the peak and 20 minutes in the off-peak to 6 minutes in the peak and 12 minutes in the off-peak. No decisions have been made regarding extending light rail beyond Mesa Town Center. Current conceptual alternatives include extending LRT east along a redeveloped Main Street or south to Chandler parallel to Mesa Drive.

Previous Plans

A review of previous transportation studies and plans conducted in and around Mesa was performed. The final reports or other study documents were reviewed and summarized and recommendations are noted.

Mesa Transportation Study

The Mesa Transportation Study was completed in November 1982. The purpose of the study was to set forth a plan for street development within the City and adjacent areas (expected to be annexed). The report described the existing conditions including population, employment roadways, traffic volumes, and level of service. The resident population at that time was 186,035 people. Traffic forecasts were prepared for the year 2005 and alternatives were developed to address existing and future problem areas. The 2005 projected resident population for the Mesa Planning area was 359,000. The analysis indicated that 27 intersections would be operating at level of service D, E, or F in 2005. Levels of Service E and F are considered unacceptable. The meaning of level of service is discussed in Chapter 4.

Alternatives that were discussed include a high capacity east-west corridor along the north side of the City, a Rio Salado Parkway in Mesa, modifications to the Superstition Freeway Corridor, Salt River crossings, and improvements in the vicinity of Falcon Field. (It should be noted that the Superstition Freeway was open to Gilbert Road at the time of the report.) Other issues that were addressed included South Country Club Drive, Stapley Drive, Longmore Street, and Center Street.

The report concluded with a description of the recommended system, an implementation program, and a discussion on financing and costs. The recommended system for 2005 included four and six through lanes for the mile arterial streets. To supplement the mile-grid streets, the development of the half-mile collector system should continue. Several intersections were noted as requiring additional turn lanes.

New facilities that were projected to be needed by 2005 include the Superstition Freeway from Val Vista Dr to Power Road, the Price-Pima Expressway, Eighth Street extension to the west, Lindsay Road across the canal and under the Superstition, the extension of Higley Road across the Salt River, a Rio Salado Parkway connecting to Thomas Road, a Thomas Road parkway between Gilbert and Power, and Baseline Road between Power Road and Ellsworth Road. In addition, it was recommended that the City “strongly push for a new limited access route along the northern edge of the City.”

Mesa Freeway Corridors Study

This two-volume report was prepared in 1987 for the City of Mesa. The study presented a recommended land use plan and economic development study for the City’s freeway corridors. The study area was a two-mile wide corridor centered on 36 miles of existing and proposed freeways in Mesa. The purpose of the plan was to identify development constraints and opportunities within the study area, to recommend ways to attract high quality economic development, to establish a balanced land use mix and compatible adjacent transportation system, and to provide a plan that could be integrated into the General Plan and the City’s economic development goals.

The study included an inventory and analysis of existing conditions, a review of similar limited access corridors in other urban areas, and an assessment of opportunities and constraints. The report concludes with chapters on the recommended land use/economic development corridor plan and a phasing program to implement the plan. The recommendations included a land use plan, transportation and infrastructure improvements, and general corridor design themes.

The study identified four transportation/infrastructure strategies for the Mesa Freeway Corridors:

- 1) Require master planning of lands located adjacent to interchanges
- 2) Provide catalysts to accelerate freeway construction
- 3) Promote alternative transportation modes
- 4) Link major residential areas to employment and commerce centers with public mass transit facilities.

The study further identified 22 transportation policies as part of the implementation framework.

North-South Corridor Study

The North-South Corridor Study was conducted in 1987 for the cities of Mesa and Chandler and the Town of Gilbert. The objective of the study was to evaluate the future north-south travel demand and traffic service. The study examined the need for north-south facilities, in addition to those already planned.

The study included an inventory of existing transportation facilities, an analysis of current conditions, a review of population and employment forecasts, the development of traffic forecasts for 2015, and an analysis of the future traffic conditions. The study presented potential alternatives including an analysis of where new or improved facilities are needed and what type of facility would best serve the future demand.

The study cited the need for additional high capacity corridors in the north-south direction based on the following: increasing traffic and congestion in the three cities, greater densities in the cities' general plans, projected traffic in 2015, a 15-mile gap between north-south freeways, and several activity centers that are not served by the planned freeway system.

The study recommended two corridors for new north-south roadways to extend between the Red Mountain and Santan Freeways, Mesa/McQueen Road (or Stapley/Cooper) and Higley Road. A high capacity arterial street or super street was considered to be a viable alternative for the Mesa/McQueen corridor and was estimated to cost \$110 million for construction. A super street was also recommended for Higley Road especially if it is extended across the Salt River to SR 87.

Williams Area Transportation Plan

The Williams Area Transportation Plan was prepared in 1997 for Williams Gateway Airport Authority and the Maricopa County Department of Transportation. The study area generally included the unincorporated area of the county south and east of Chandler, Gilbert, and Mesa and included the Town of Queen Creek and the Williams Gateway Airport.

Historically, the development in the area was agricultural and low density residential. However, with the opening of Williams Gateway, ASU East, and growth in the adjacent communities, there was potential for substantial economic growth in the area. The need to plan for future transportation facilities was recognized. As stated in the report, “without the means to transport people and products effectively, economic development within the area may be constrained.” Therefore, the Williams Area Transportation Plan was undertaken to identify transportation improvements to safely and effectively handle future travel demands in southeast Maricopa County.

The study included collecting existing and future data on the transportation system, land uses and population and employment, developing a travel demand model for the study area, and evaluating the future transportation system using the model. The study concludes with recommendations for the area’s transportation system, an implementation plan, and possible funding mechanisms.

The key recommendations of the study were complete the Santan Freeway including an interchange at Hawes Road, preserve 130 feet of right-of-way on arterial streets to accommodate six-lane streets, manage arterial street access, reclassify Rittenhouse Road to a local or collector street west of Power Road, expand the regional bus system to serve the area, and support rail service connecting Williams Gateway to other parts of the metropolitan area.

Adjacent Plans

Plans of neighboring jurisdictions were reviewed to assess the impact on the City of Mesa transportation system.

City of Tempe

The current City of Tempe Transportation Plan dated August 1985 does not include any recommended improvements for east-west streets that continue into the City of Mesa. It should be noted that the City of Tempe is currently updating their transportation plan.

City of Chandler

The City of Chandler completed a transportation plan in May 2001. The portion of the long range plan that impacts the City of Mesa includes a recommendation to provide six through lanes on Alma School Road and Dobson Road.

Maricopa County DOT

Maricopa County prepared a major street and roads plan (MSRP) dated August 14, 2000. The county MSRP includes a recommendation for Roads of Regional Significance (RRS), which includes Country Club Drive, Gilbert Road, Higley Road north of US 60, Power Road south of US 60, and University Drive. The recommendation for these RRS is a cross section with six lanes, a raised median, as well as restrictions on access points. Regarding other roadways on county islands, the county has adopted a policy to match the roadway classification adopted by the surrounding jurisdiction.

Salt River Pima-Maricopa Indian Community

The Salt River Pima-Maricopa Indian Community completed a transportation study, which was documented in a draft Final Report dated October 2000. Two of the recommended improvements that directly affect the City of Mesa are the extension of Horne Street from Thomas Road to SR 87 and the extension of Higley Road from the north city limit to SR 87. While these two projects were recommended, neither was identified as a priority project.

Town of Gilbert Arterial Street Plan

The Town of Gilbert is in the process of preparing an Arterial Street Plan. The plan will include recommendations for arterial street widening and intersection improvements. This study is not expected to be completed before the Mesa Transportation Plan is final.

Southeast Maricopa/Northern Pinal County Area Transportation Plan

The Maricopa Association of Governments, Central Arizona Association of Governments, and ADOT are jointly conducting a transportation study that includes Northern Pinal County and Southeast Maricopa County. The purpose of this study is to document the interaction between two rapidly growing areas and make recommendations to address the transportation needs. This study is not expected to be completed before the Mesa Transportation Plan is final. Therefore, it will be necessary to revisit the recommendations of this plan as part of a Southeast Mesa Subarea Transportation Plan.

4.0 STREET PLAN



The arterial street system forms the backbone of the City's multi-modal transportation system. A street is more than curb, gutter, and pavement built to serve the private automobile. The street right of way is often shared by several different transportation modes including automobiles, trucks, buses, bicycles and pedestrians. Improvements to the street system must balance the needs of all modes. The street system provides access to activity centers, supports new development, and provides for recreational travel. While widening streets adds capacity to the system, it cannot eliminate congestion. The modern street system provides a combination of integrated components that can work together to manage congestion.

The Street Realm

Work by the Metropolitan Regional Services District in Portland, Oregon (Creating Livable Streets, Street Guidelines for 2040, November 1997) suggests there are three sub-components of the street realm: 1) a travelway realm; 2) a pedestrian realm; and 3) an adjacent land use realm (Figure 4-1).

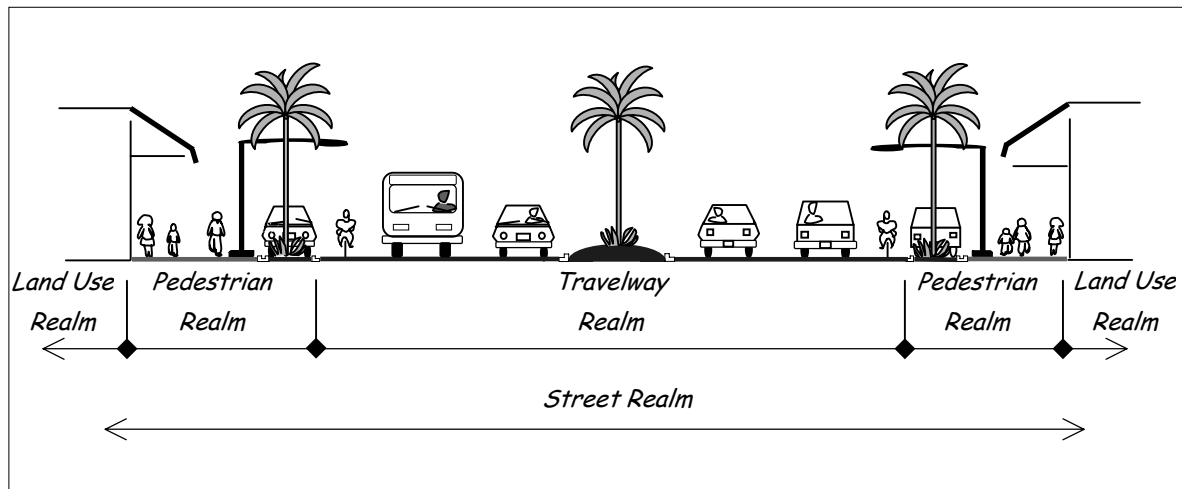
Travelway Realm

The travelway realm usually lies within the public right-of-way, and includes intersections, medians, and travel lanes for motorized vehicles (autos, transit vehicles, commercial vehicles, etc.) and bicycles.

Pedestrian Realm

The pedestrian realm lies between the travelway realm and the land use realm, usually within the public right-of-way. This area provides for the movement and interaction of pedestrians, and includes sidewalks and on-street parking. The pedestrian realm provides critical space for pedestrians to travel between realms, and to access other forms of transport (e.g., biking and transit). A detailed description of the pedestrian realm is included in the Pedestrian Plan.

Figure 4-1
Components of the Street Realm



Adapted from Creating Livable Streets, Street Guidelines for 2040, Metro Regional Services, November 1997.

Viewed as a whole, the street realm is a complex system of interrelated elements. Part of the challenge of creating a multi-modal transportation system is understanding how the three realms relate to one another. When considering a street improvement (e.g., widening a street or intersection) care must be taken to ensure the new street is integrated with the pedestrian realm and the adjacent land use realm. Conversely, development proposals (e.g., new subdivisions and shopping centers) must be integrated with the pedestrian realm and the travelway realm.

The City's arterial street system has generally developed from west to east. The street system west of Gilbert Road is typically constrained by limited right of way and minimal building setbacks. It is much more difficult to accommodate street widening improvements in this area and alternative improvements such as intersection widening and enhancements to other modes

were considered. There are more opportunities to widen streets, where needed, east of Gilbert Road. In the undeveloped areas, adequate right of way to accommodate six through lanes should be obtained, even if only four lanes are initially constructed.

The expansion and improvement of the street system will continue to be a priority. As streets are widened and new streets are built, the cross section will include provisions for bicycles. Bus pullouts will be provided at major intersections, layover points, and other high activity locations. Additional landscaping will be provided to enhance the pedestrian environment and to create an aesthetically pleasing street system.

Maintaining the integrity of the City's street system is vitally important. Street maintenance cannot be overlooked when establishing street system funding priorities and, in fact, it may be more important to fund the maintenance and operation of the current system before additional new miles are constructed.

The remainder of this chapter describes the basis for the recommended improvements, defines each type of improvement, presents a functional class map and median location map, and shows the preferred street system with recommended priorities.

Arterial Street System

Roadway System

The City of Mesa has a street system comprised of section line and mid-section line streets that form a grid network that is the backbone of the transportation system. The network includes streets that have 2, 4, 6, or 8 through lanes, center two-way left turn lane or raised medians, and various configurations at the major intersections.

The existing number of through lanes is shown in Figure 4-2. The majority of the existing streets have 4 or 6 through lanes. There are approximately 148 miles of four-lane streets and 50 miles of six-lane streets.

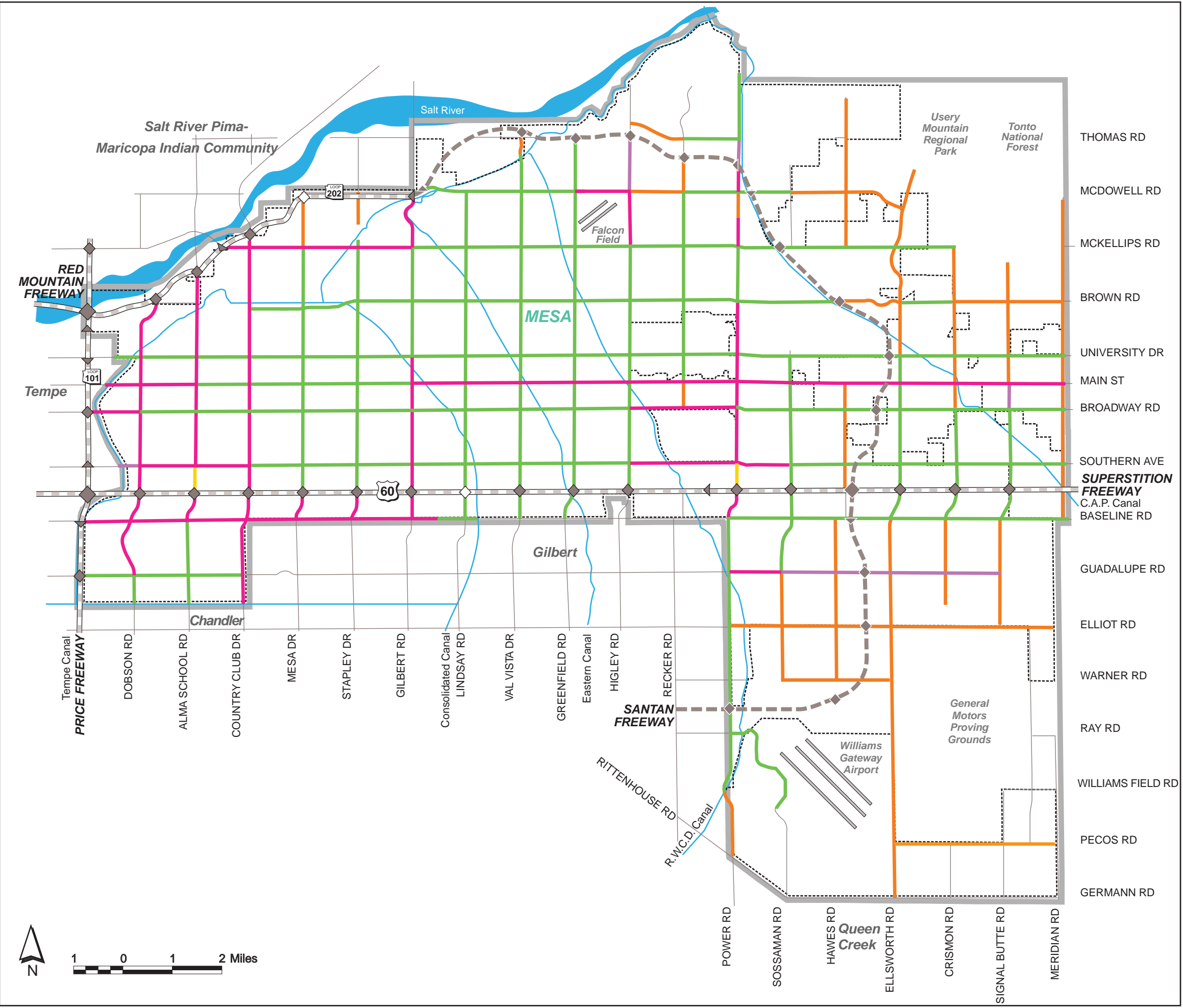
Transportation Plan



Existing Number of Through Lanes

Figure 4-2

- 8 Lane Arterial
- 6 Lane Arterial
- 5 Lane Arterial
- 4 Lane Arterial
- 2 Lane Arterial
- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Traffic Data

This section includes a review of existing traffic data including travel time data, traffic volumes, and Level of Service.

Travel Time

The City of Mesa performed a travel time study in the spring of 2000. The results of that study are documented in a report titled "City of Mesa 2000 Travel Time Study" dated August 25, 2000. The study was conducted on 119 miles of streets and included a comparison with the results of a 1985 study. The travel times were collected for the AM and PM peak periods and for the AM and PM off-peak periods using the "average car" method where a vehicle travels according to the driver's judgment of the average speed of the traffic stream. The peak direction is northbound or westbound in the AM and southbound or eastbound in the PM.

A comparison between the 1985 and 2000 travel time results is summarized in Table 4-1.

**Table 4-1
Average Travel Speed Comparison**

Time Period/Direction	1985 (Mi/Hr)	2000 (Mi/Hr)	% Change
AM Peak-Southbound or Westbound	31.1	28.3	-9.2
AM Peak-Northbound or Eastbound	31.4	31.0	-1.3
Midday-Southbound or Westbound	30.8	30.4	-1.2
Midday-Northbound or Eastbound	30.1	31.3	4.0
PM Peak-Southbound or Westbound	28.3	25.9	-8.5
PM Peak-Northbound or Eastbound	28.7	24.8	-13.9

As can be seen in Table 4-1, except for the PM midday period, travel speeds have decreased since 1985.

Traffic Volumes

Traffic volumes are typically described in two different forms. One is a 24-hour volume or daily volume and the other is a peak hour turning movement and is usually identified as the AM or PM peak hour. Daily volumes are obtained on road segments and can either be by direction or the total of both directions. Turning movements are intersection volumes that detail the number of left turns, through, and right turns on each approach. Both types of traffic volumes are summarized in the following sections.

Daily Traffic

The City of Mesa Transportation Division maintains a very comprehensive traffic counting program on its major streets. Daily traffic counts are conducted on half of the streets every year, which means that each street segment is counted once every two years. The 24-hour volumes are published in map form annually by the Transportation Division. The "2001 Traffic

Volume Map” actually represents 1999 and 2000 traffic data. The existing daily traffic is shown in Figure 4-3. Those locations with daily traffic volumes in excess of 40,000 vehicles per day are summarized in Table 4-2. Daily volumes are an indication of demand on road segments and can be used to gauge the number of through lanes needed on a given street segment.

Table 4-2
Highest Traffic Volumes

Street	Limits	Volume Range (Veh/Day)
McKellips Road	SR 202 to Lindsay Road	44,000 – 61,000
Dobson Road	Southern Avenue to the City limit	41,000 – 44,000
Alma School Road	Broadway Road to the City limit	41,000 – 49,000
Country Club Drive	Broadway Road to Baseline Road	45,000 – 51,000
Mesa Drive	Southern Avenue to Baseline Road	44,000 – 46,000
Gilbert Road	Southern Avenue to Baseline Road	43,000 – 47,000
Power Road	Main Street to US 60	40,000 - 41,000

With the exception of McKellips Road, the highest traffic volumes are found on north-south streets.

Traffic volumes vary throughout the day. A review of the traffic volume data shows that on most streets, there is a morning peak, then a gradual increase throughout the day until the evening peak, which is the highest. However, on Gilbert Road and Southern Avenue, there are distinct morning and evening peaks. It is also interesting to note that on Southern Avenue the morning peak is slightly higher than the evening peak, but does not last as long.

Daily traffic volumes for the most recent six years (1995-2000) were reviewed to document current growth patterns in the City. The technique used to define these growth patterns is known as “screenlines.” Screenlines are a tool used to define changes in traffic volume across a geographic area. A screenline is an imaginary line that bisects several streets. The volume on the streets that cross the screenline can be summed and compared with other screenlines in the same year or the same screenline in different years. A north-south screenline examines east-west volumes and an east-west screenline examines north-south volumes. The screenlines are shown in Figure 4-4.

The traffic volume growth over the six-year period ranges from 3% in the western part of the City to 59% in east Mesa. As seen in the figure, the largest percent increases between 1994 and 2000 have occurred in east Mesa and south of US 60 followed by significant increases in the central part of the City between Mesa Drive and Val Vista Drive.

Transportation Plan

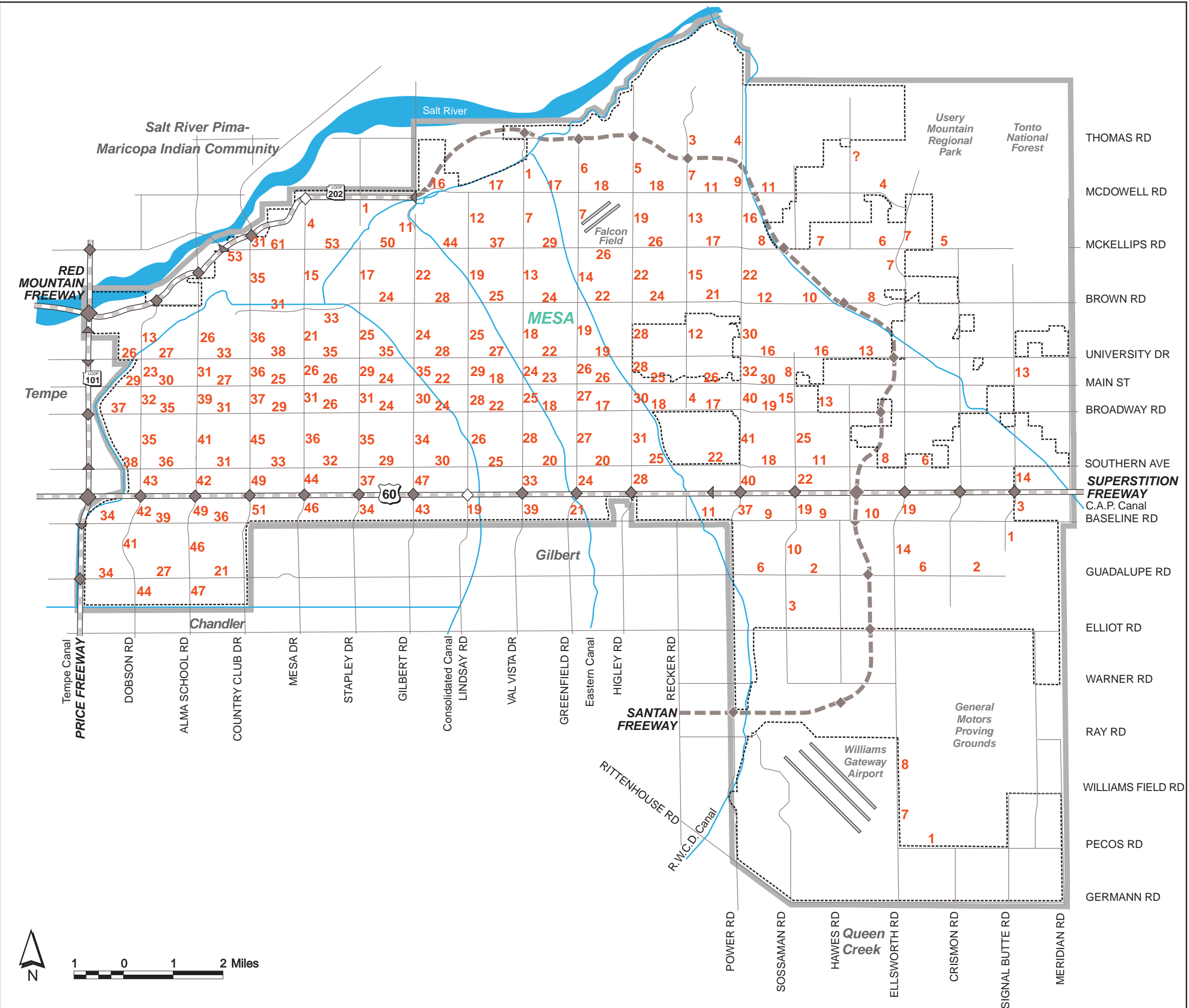


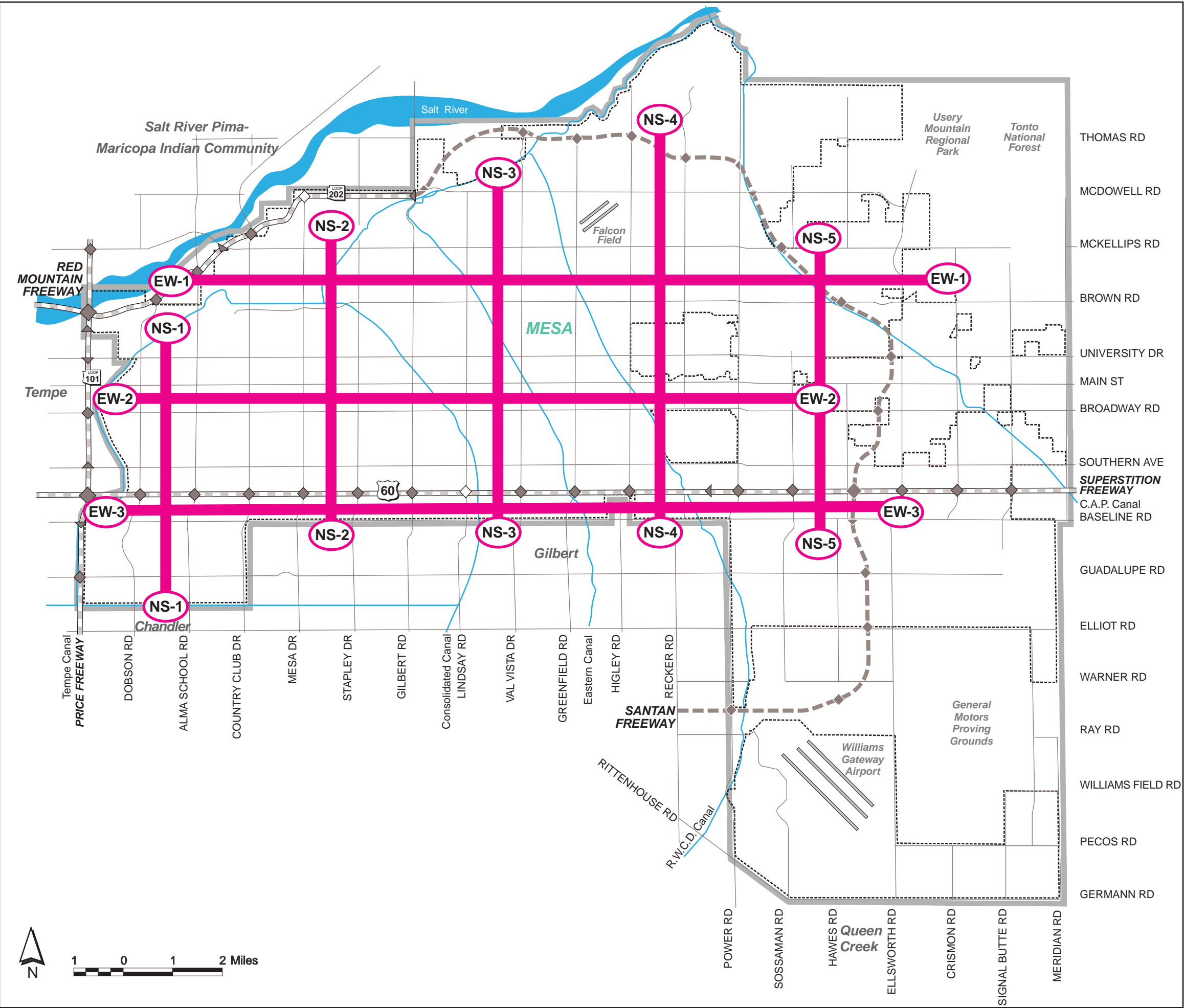
Existing Daily Traffic Volumes

Figure 4-3

(Volumes in Thousands for an Average Weekday)

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways





Transportation Plan



Screenline Comparisons

Figure 4-4

TRAFFIC GROWTH 1994-2000	
Screenline	% Change
NS-1	3%
NS-2	28%
NS-3	25%
NS-4	10%
NS-5	59%
EW-1	19%
EW-2	9%
EW-3	46%

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Turning Movement Volumes

Intersection turning movement volumes were obtained from a recent study completed by the Maricopa Association of Governments (MAG). It is commonly accepted that intersections are the constraint point in a street system and are often analyzed to document current operations as well as potential improvements. An hourly volume of 800 vehicles per through lane is considered the capacity for a major intersection. A left turn volume of 250-300 vehicles per hour is a practical limit for a single left turn. A right turn volume of 150-200 vehicles per hour indicates the need for a separate right turn lane.

Level of Service

Level of Service (LOS) is a term used to describe traffic operations. Level of Service can be calculated for the various elements of a street system including road segments, signalized intersections, and unsignalized intersections. The various levels of service, which range from A to F, are generally defined as follows:

- **Level of Service A** represents free flow.
- **Level of Service B** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.
- **Level of Service C** is in the range of stable flow, but marks the beginning of the range in which the operation of individual users becomes significantly affected by others.
- **Level of Service D** represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience.
- **Level of Service E** represents operating conditions at or near the capacity level. All speeds are reduced to a low but relatively uniform value. LOS E is unstable and can quickly deteriorate to LOS F.
- **Level of Service F** is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount, which can traverse the point.

The Level of Service analysis was performed utilizing the signalized intersection operations methodology presented in the Highway Capacity Manual (TRB, Special Report 209, Third Edition, revised 1997). This method uses the critical volumes passing through the intersection in one hour and compares those volumes to the capacity of the intersection and defines an associated delay. The analysis incorporates the effects of traffic volumes, geometry, traffic signal operation, truck and local bus volumes, pedestrian activity, and peaking characteristics. The result is a Level of Service determination for each approach and for the intersection as a whole.

3-10

FREEWAYS



Illustration 3-5. LOS A.



Illustration 3-8. LOS D.

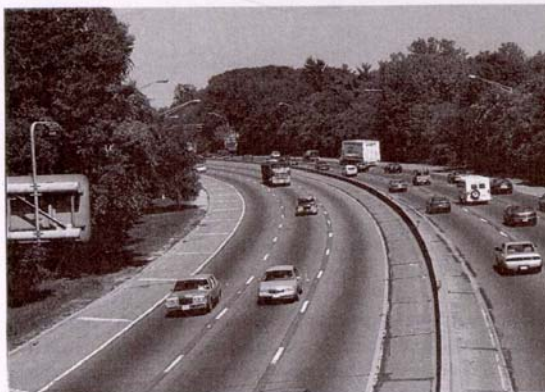


Illustration 3-6. LOS B.

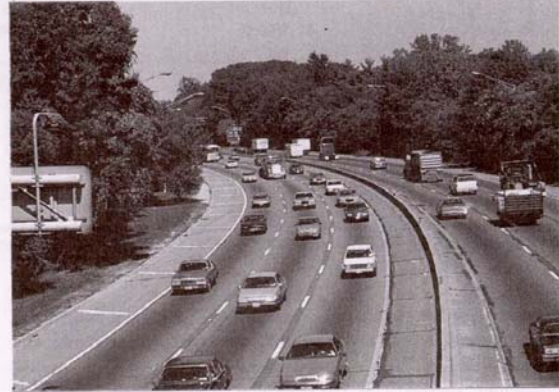


Illustration 3-9. LOS E.



Illustration 3-7. LOS C.



Illustration 3-10. LOS F.

The capacity criteria, in terms of average vehicle delay, are presented in Table 4-3.

Table 4-3
Capacity Criteria For Signalized Intersections

Level of Service (LOS)	Average Vehicle Delay (Sec/Veh)
A	less than 10
B	10.1-20
C	20.1-35
D	35.1-55
E	55.1-80
F	Over 80

Source: 1997 Highway Capacity Manual

Table 4-4 presents a summary of the number of study intersections currently operating at each Level of Service.

Table 4-4
Intersection Level of Service Summary

Level of Service	AM PEAK		PM PEAK	
	Number of Intersections	Percent	Number of Intersections	Percent
A	0	0	0	0
B	9	9	7	7
C	33	34	20	21
D	15	15	18	19
E	17	18	14	15
F	23	24	37	38

The AM and PM peak levels of service for the major signalized intersections are shown in Figures 4-5 and 4-6.

Transportation Plan



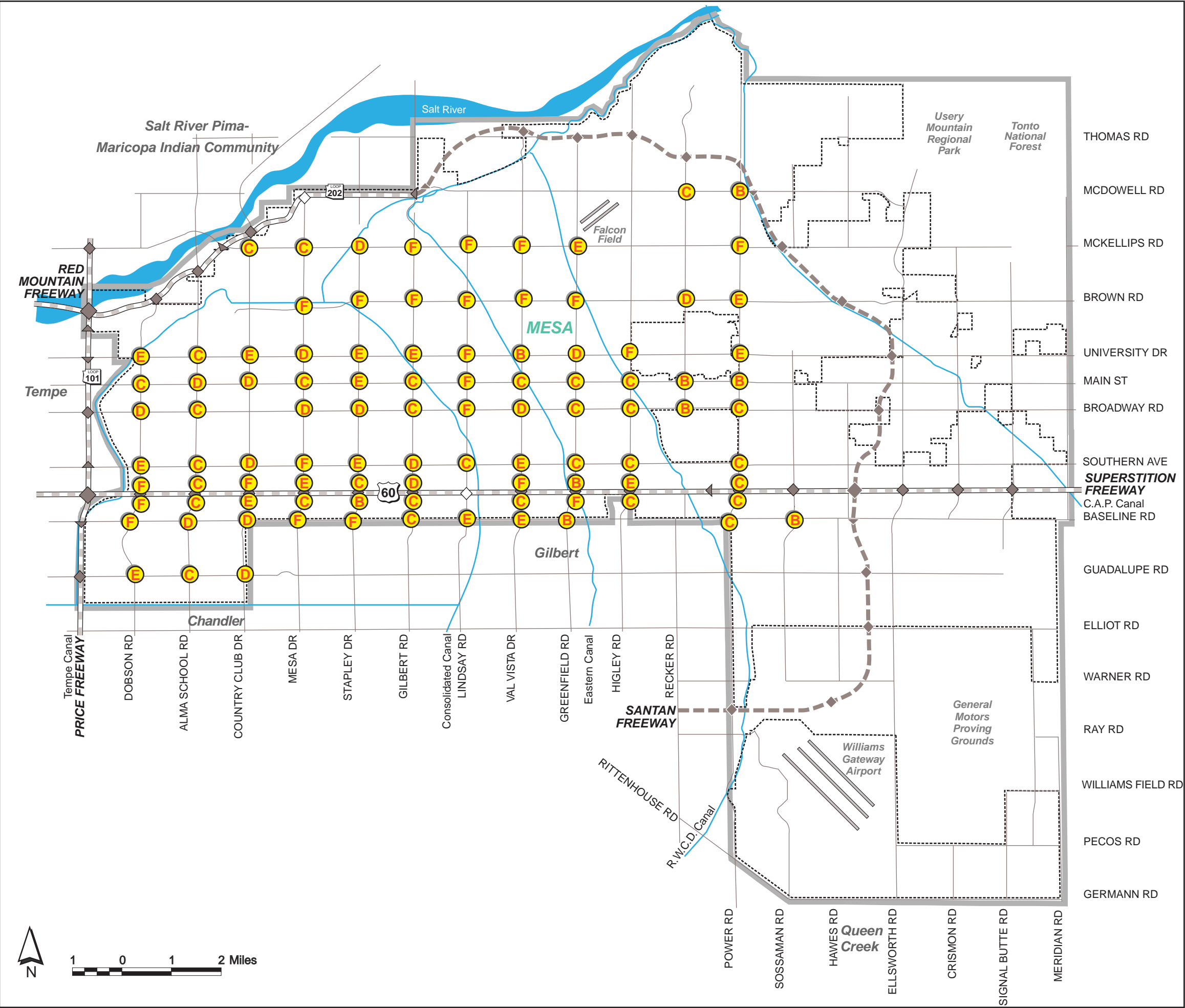
Existing Level of Service

AM PEAK HOUR Figure 4-5

LEVEL OF SERVICE DEFINITIONS

- Little or No Delay
- Congested

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Transportation Plan



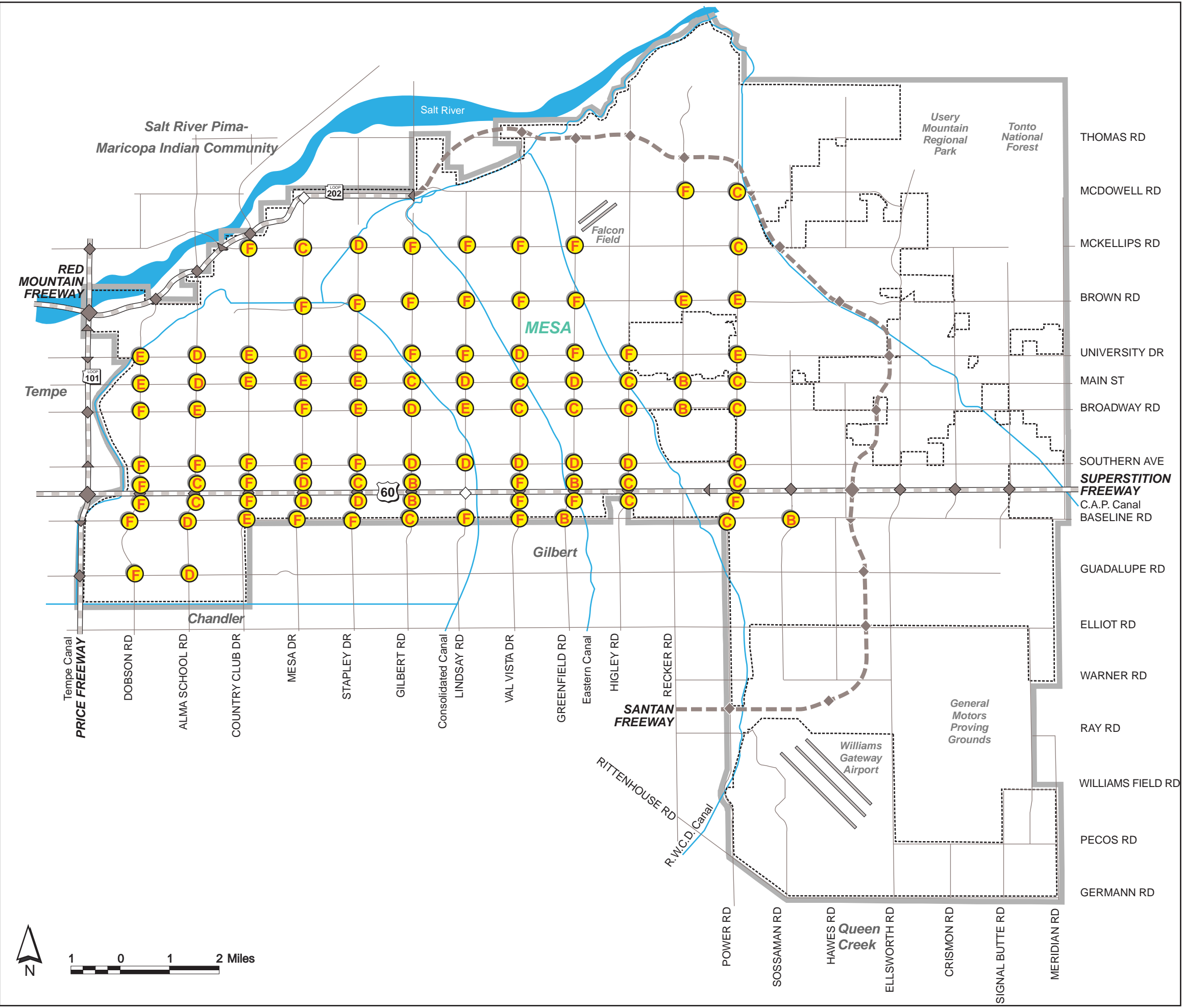
Existing Level of Service

PM PEAK HOUR Figure 4-6

LEVEL OF SERVICE DEFINITIONS

- A Little or No Delay
- F Congested

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Intersection Widening and Street Widening

As part of this transportation plan study process, the practice of widening streets from four to six lanes versus only improving major intersections to include additional lanes was compared. The comparison included cost, operational improvement, neighborhood impacts, and business impacts. Detailed operations analysis comparing the two options was completed and is documented in a separate report titled Southern Avenue Corridor Analysis. Highlights from that report are included in this summary.

The City of Mesa currently uses both types of improvement to add capacity to the street system. The public and elected officials have recently started to question whether entire street segments need to be widened or only the major intersections.

While it is commonly accepted that the capacity constraint in a street system is the major signalized intersections, there are advantages and disadvantages with each type of improvement.

Arterial Street Widening

Widening a one-mile section of street provides three through lanes in each direction with a center two-way left turn lane or a raised median. With a two way left turn lane, the pavement is 88 feet wide and with a raised median, the pavement is 94 feet wide. In either case, 130 feet of right of way is provided. When a street is widened to six through lanes, the major intersections are also widened to provide dual left turn lanes and right turn lanes where feasible.



Major Intersection Widening

Widening a major arterial intersection would provide dual left-turn lanes, three through lanes, and right turn lanes, where feasible, in each direction when one or both intersecting streets have only four through lanes.

Table 4-5 summarizes the comparison between intersection improvement and street widening.

**Table 4-5
Improvement Comparison**

Criteria	Street Widening	Intersection Improvement
Capacity	49,600 vehicles per day	41,600 vehicles per day
Right of way	130 feet for the entire mile	140 feet just at the intersection
Residential impacts	Yes	Minimal
Business impacts	Yes	Yes
Bus operations	Utilize 50% of the through lanes	Utilize 33% of the through lanes
System continuity	Yes, constant street cross section	No, varies from four to six lanes
Cost	\$3.9 million per mile (includes intersection improvement)	\$1.9 million per intersection
Intersection delay	Southern & Country Club-48 sec/veh Southern & Mesa Drive-38 sec/veh Southern & Stapley-40 sec/veh	Southern & Country Club-60 sec/veh Southern & Mesa Drive-43 sec/veh Southern & Stapley-45 sec/veh

Neighborhood Traffic Management

As traffic volumes increase, Mesa, like most communities across the country, will face the challenge of maintaining safe streets within our neighborhoods. A traffic-calming program is intended to reduce the negative effects of motor vehicle use by altering driver behavior and improving conditions for non-motorized street users.

There are three primary strategies that are recommended: route modification measures, passive measures and physical measures.

Route Modification Measures

Reducing the traffic volume on a residential street is a method utilized to calm neighborhood traffic. This can be accomplished in several ways including simple signing, turn diverters, or road closures.



Passive Measures

Passive traffic calming measures rely upon human psychology to affect driver behavior. Methods include striping (visually narrowing the road), signing (speed limit signs), adding on-street parking, and even enhancing the vegetation or adding streetscape elements. Community awareness programs are also effective passive measures. Mesa currently administers a “Pace Car Program” that encourages residents to sign a pledge to obey the speed limit. Upon signing the pledge, the resident is given a window or bumper sticker that proclaims that they are an “Official City of Mesa Pace Car”. Programs such as the Pace Car Program increase awareness and unite neighborhoods in their efforts to control speeding.

In addition to the “Pace Car Program,” the City of Mesa utilizes other passive measures to augment their Neighborhood Traffic Safety Program. Measures include:

- A speaker’s bureau
- A video lending library
- A radar gun lending program with notification process
- Speed trailer referrals
- Selective enforcement referral
- A Walking School Bus program

Physical Measures

Physical changes to a roadway that create horizontal or vertical forces on vehicle occupants are another traffic calming method. Speed humps are the most common physical measure utilized, however, they are not always an appropriate solution. Several conditions may preclude the use of speed humps including fire routes and drainage conditions.

Other physical measures include traffic circles, chicanes (curb extensions), medians or center islands and chokers (curb extensions that narrow a street).

Neighborhood Traffic Management can also be done in conjunction with Neighborhood Services as a component of Opportunity Zones.

Traffic Safety Education

Population growth and increased traffic volume, unfortunately, often lead to a rise in traffic related fatalities. The leading cause of death for ages 1-34 in the United States is traffic crashes. Traffic is the leading cause of death for children in our country.

Consistent community education efforts are needed to combat this tragedy. Most traffic crashes are the result of driver error and are preventable. A traffic safety education program that specifically targets children, young drivers, and commuters is critical. This

During 2000, there were 9,840 traffic crashes in Mesa. Because of those crashes, 29 lives were lost. Of those fatalities, 78% were not wearing a seatbelt. Statistics published by the National Highway Transportation Safety Administration have shown that the use of seat belts reduces the risk of sustaining a life threatening injury in a traffic crash by up to 60%. In addition, children who are properly restrained in car seats are 70% less likely to die in a crash.

program should focus on high-risk demographic groups as well as high-risk behaviors, such as speeding and failure to use a seat belt. Information, education, and training should be provided to the community using a variety of interactive methods including classroom curriculum, media, community events, and programs.

Examples of outreach activities that have been implemented during 2001 include the following:

- Monthly traffic safety articles in the utility bill newsletter;
- Development of a series of traffic safety brochures;
- The “Traffic Jam” program that targets high school drivers;
- The School Partnership Program (a pilot program providing traffic safety interventions to elementary-aged children in Mesa);
- A series of traffic education seminars at the Mesa Public Library;
- Providing traffic safety education at community events; and
- Development of programs to assist residents in making Mesa safer (the Pace Car Program, the Walking School Bus Program).

A strategy to continue these educational outreach efforts and expand this program is important to the safety of our growing community.

2025 Travel Forecasts

The MAG travel-forecasting model was used to develop traffic forecasts for the year 2025. The model uses the socioeconomic forecasts and highway networks as described above. The population and employment that results from the land use plan included in the General Plan was used as the City’s socioeconomic data. The transportation network included the regional freeway system and LRT line previously described.

In addition to the adjustments to the Mesa zones, the model was modified to account for the rapid growth occurring in the northern portion of Pinal County. However, the amount of growth that may occur in Pinal County is unknown. Should growth occur more rapidly or be higher than was assumed in this analysis, the traffic forecasts, particularly in the eastern portion of the City can be expected to be higher than shown here. A new study just underway, by MAG and the Central Arizona Association of Governments (CAAG), will further document the future travel between southeastern Maricopa County and Pinal County.

The raw numbers obtained from the traffic model runs were adjusted to account for known estimation errors in the model determined by a comparison of the 1998 model validation run and actual counts. The forecasts were further adjusted to “smooth” out inconsistencies that are

inevitable in model-generated numbers. The resulting forecasts for 2025 are shown in Figure 4-7. While these forecasts are described as 2025, they are more accurately defined as the traffic forecasts when the population reaches 636,000 and the employment 358,000.

Transportation Plan

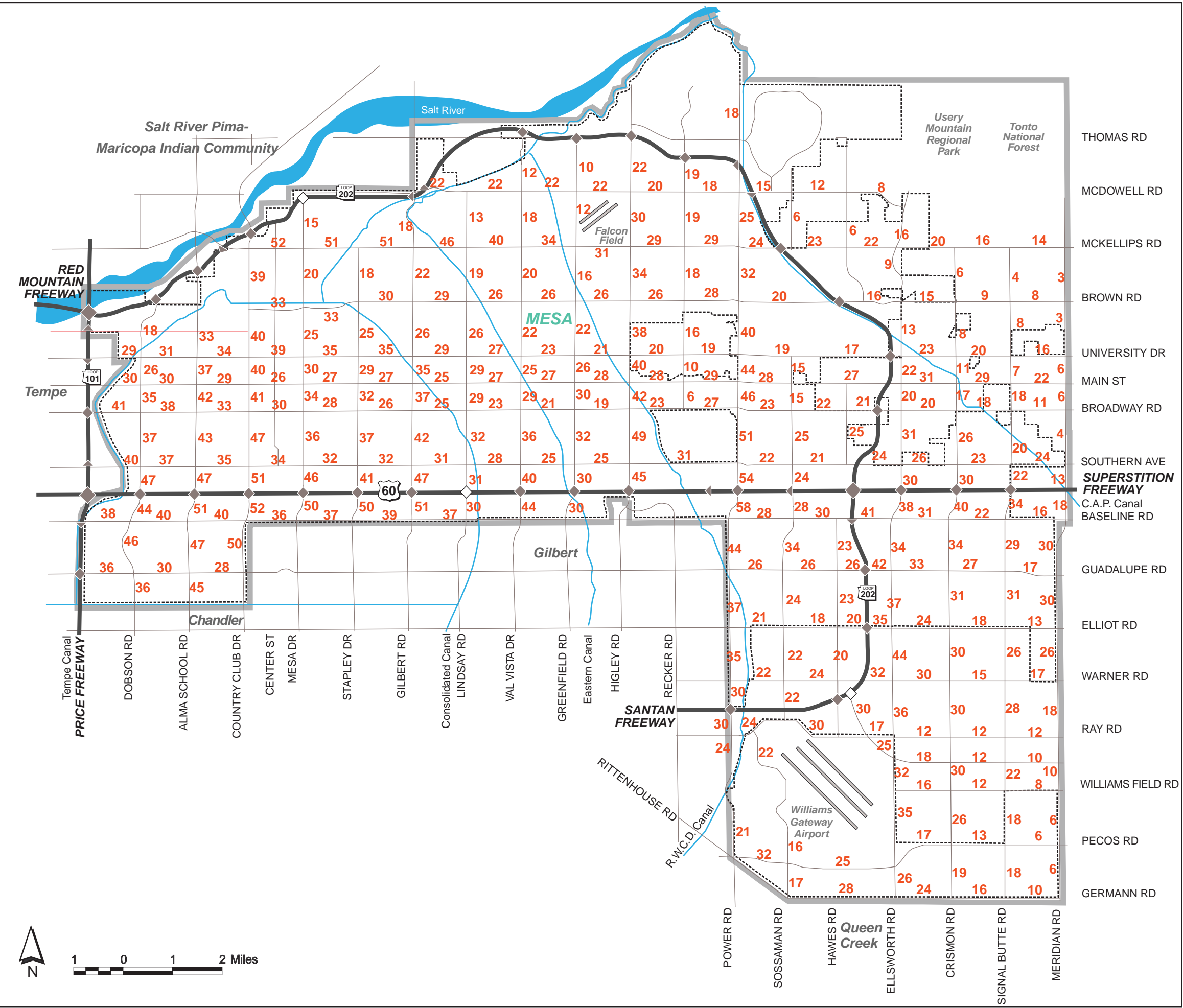


2025 Daily Traffic Forecasts

Figure 4-7

(Volumes in Thousands for an Average Weekday)

- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



The operating efficiency of a future roadway system is often measured by the Level of Service of the road segments. Level of Service is a term used to describe the degree of traffic congestion on a roadway. The various levels of service, which range from A to F, were previously defined in this chapter. Level of Service D is generally considered as the threshold of acceptable conditions in an urban area and was the level selected for this study.

The vehicle capacity of a roadway segment can be defined as “the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic, and control conditions.” Capacity is normally considered the point where Level of Service changes from E to F. The capacity of a road segment can be estimated using the maximum hourly service flows for multi-lane highways presented in the Highway Capacity Manual (HCM), Table 7-1.

The segment volume thresholds for Level of Service D and E of two, four, and six-lane major arterial streets are presented in Table 4-6. Also shown is a four-lane major street with intersection widening at the major intersections to provide six through lanes and extra turn lanes.

Table 4-6
LOS D & LOS E Volume Thresholds

Number of Lanes	LOS D Volume	LOS E Volume
2	11,100	14,500
4	27,700	36,200
4 lane with 6 lane intersection*	31,800	41,600
6	37,900	49,600

**Street segment has four through lanes, but major intersections are improved to include six through lanes, dual left turn lanes and right turn lanes on all approaches*

The operating efficiency of a roadway segment is further defined by comparing volume to capacity. The ratio of the volume on a segment of road compared to the traffic capacity of the segment is known as the v/c ratio. This is calculated for each segment by simply dividing the traffic volume or forecast for the segment by the capacity of the segment.

The volume to capacity ratio is equated to Level of Service to define the performance of a road segment. The relationship between v/c ratio and Level of Service is summarized in Table 4-7.

Table 4-7
LOS and V/C Relationship

Level of Service	V/C Range
A	0.0 to 0.3
B	0.31 to .45
C	0.46 to 0.61
D	0.62 to 0.76
E	0.77 to 1.0
F	greater than 1.0

The calculated Level of Service represents an average condition throughout the year. The Level of Service can be expected to be better in the summer months when traffic volumes are lower and worse in the winter months when daily traffic volumes are the highest. In addition, Level of Service is worse during the year-end holiday season and during special events.

Also, the Level of Service represents an average for the intersection. One or more approaches or specific turning movements may be worse than the average during the peak hours.

The existing number of lanes was compared to the buildout traffic forecasts using the volume thresholds and Level of Service described above to define the future operating conditions if no additional street improvements were made. The street segments with a volume to capacity ratio at Level of Service E and F are shown in Figure 4-8. The number of segments is shown in Table 4-8. The results of that analysis shows that 68 street segments would be operating at Level of Service E and 24 street segments would be operating at Level of Service F.

Table 4-8
Base Conditions Operations

Level of Service	V/C Range	No. of Segments
E	0.77 to 0.90	50
E	0.90 to 0.99	18
F	1.0 to 1.10	20
F	greater than 1.10	4

Transportation Plan



2025 Base System Level of Service

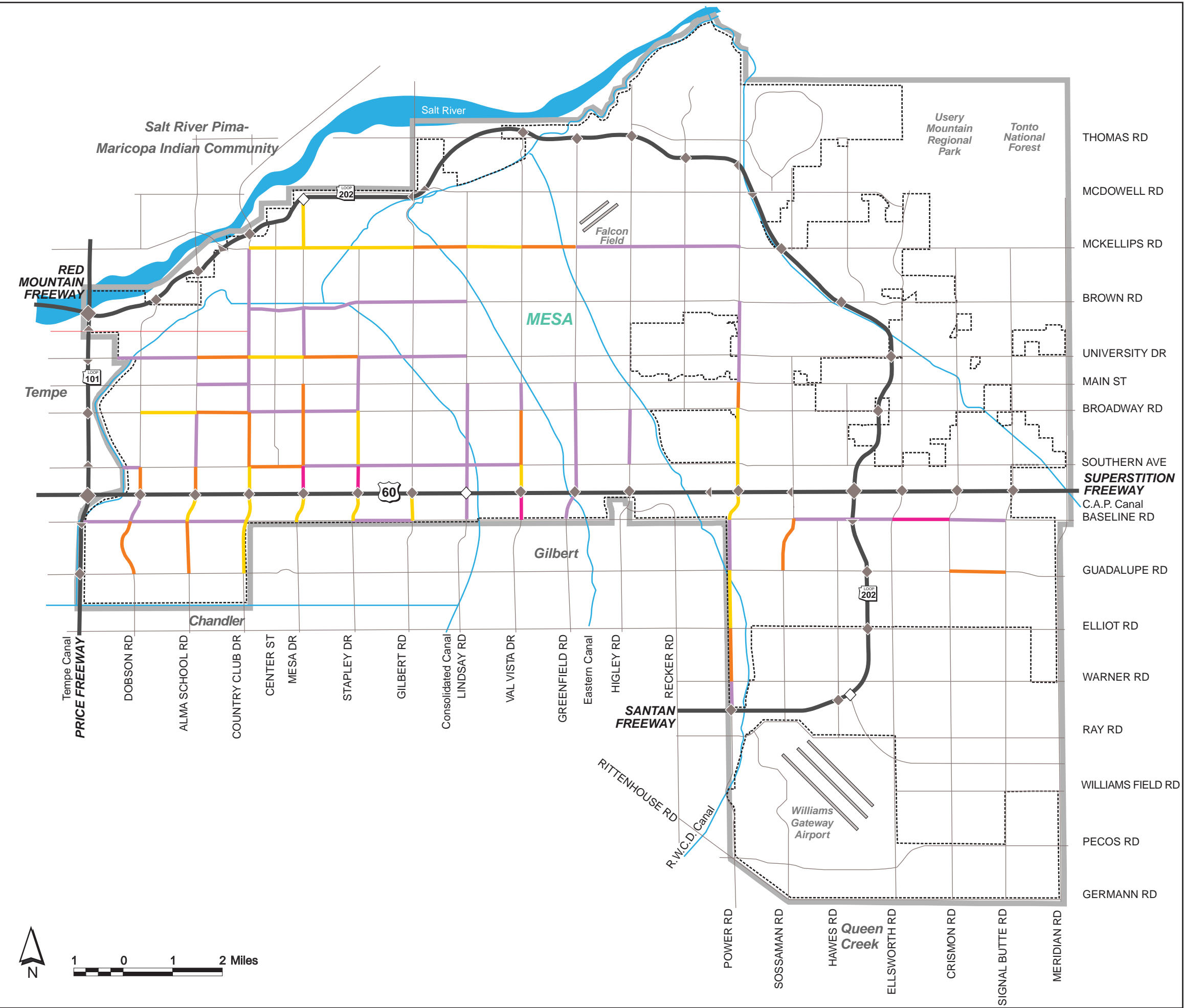
Figure 4-8

V/C Ratio = Volume to Capacity Ratio

0.77 - 1.0 = LOS E

> 1.0 = LOS F

- > 1.1
- 1.0 to 1.1
- 0.91 to 0.99
- 0.77 to 0.90
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



Basis of Improvements

The basis of improvement for the arterial street system considers a number of qualitative and quantitative factors including Level of Service, right of way, existing land use, future land use, JMPC input, and Transportation Advisory Board (TAB) input. The traffic forecasts for the year 2025 and the Level of Service D volume for a four-lane or six-lane street were compared for each street segment. If the road segment traffic forecast is less than the volume for Level of Service D for a four-lane street, then a four-lane street is adequate. If the road segment traffic forecast is more than the Level of Service D volume for a four-lane street, then a six-lane street or intersection widening at the major intersections is needed.

However, particularly in the developed areas of the City, the existing land use and right of way were also a major consideration determining if street or intersection widening should be included in the plan. For example, on sections of Broadway Road and University Drive in the western part of the City, the lack of right of way and the proximity of adjacent land uses were primary reasons to retain the four lane sections.

Definition of Improvements

There are a number of different types of street improvements that were considered in the development of the arterial street plan. Each is briefly described below. It should be noted that for the purpose of this analysis, it is assumed that an existing two-lane street would not meet the pavement requirements of an urban arterial street and would be completely reconstructed to a four or six-lane street. An existing four-lane street is assumed to meet urban arterial standards and would be widened to six lanes without complete reconstruction. However, a pavement overlay would be placed over the entire roadway.

New Four-Lane Street

The right of way for this cross section is 130 feet and the roadway width is 68 feet without a raised median and 72 feet with a raised median. A 130-foot right of way is recommended so that additional right of way would not be required if the street had to be widened to six lanes at some future date. The cross section includes a bike lane and two travel lanes in each direction with a center two way left turn lane or a raised median. The cross section provides for 11-foot travel lanes and two way left turn lane and 6.5-foot bicycle lanes. If a raised median is included, it is 16 feet wide and the space allocated to bicycles is reduced to 6 feet. The outside features of the cross section include curb, gutter, and sidewalk. Unless a major intersection along a four-lane street is shown as an intersection improvement on the preferred alternative, four-lane streets would include two left turn lanes and one right turn lane on each approach at the major intersections. The estimated construction cost for one mile of this cross section is \$3.0 million

and includes the street section described above, street lighting, traffic signals, drainage, and landscaping.

New Six-Lane Street

The cross section for a six-lane street includes a bike lane and three travel lanes in each direction with a center two way left turn lane or a raised median. The right of way for this cross section is 130 feet and the roadway width is 88 feet if a center two-way left turn lane is provided and 94 feet if a raised median is provided. If the cross section has a two way left turn lane, then there are 11-foot travel lanes and two way left turn lane and 5.5-foot bicycle lanes. If a raised median is included, it is 16 feet wide and the bicycles lanes would be 6 feet. The outside features of the cross section include curb, gutter, and sidewalk. Six-lane streets would include two left turn and one right turn lane on each approach at the major intersections. The estimated construction cost for one mile of this cross section is \$4.5 million and includes the street section described above, street lighting, traffic signals, drainage, and landscaping.



Widen From Four To Six Lanes

The roadway width for this cross section is 88 feet if a center two-way left turn lane is provided and 94 feet if a raised median is provided, with a right of way of 130 feet. The other features are as described above for a new six-lane street. It is assumed that the existing pavement does not have to be reconstructed, but would have an overlay. Six lane streets would include two left turn and one right turn

lane on each approach at the major intersections. The estimated construction cost for one mile of this cross section is \$3.9 million and includes the street section described above, removal of existing curb, gutter, and sidewalk, new street lighting, new or modified traffic signals, drainage modifications, and landscaping.

Intersection Improvement

There are several different types of intersection improvements designated depending on the configuration of the intersecting streets. Generally the scope of an intersection improvement includes widening to provide a bike lane, three through lanes, dual left turn lanes and a right turn lane on each approach, as well as traffic signal improvements. However, there are select locations where only two through lanes and dual left turn lanes are provided as shown on the street plan. The estimated cost for an intersection improvement ranges from \$1.5 to \$2.5 million.

New Four-Lane Parkway

The right of way for this cross section is 130 feet and the roadway width is 68 feet. The cross section includes two travel lanes in each direction with a raised median. The cross section provides for 13-foot travel lanes and a 16 feet wide median. The outside features of the cross section include curb, gutter, and sidewalk. Selected major intersection along a parkway would be grade separated and all turning movements would be provided. The at-grade intersections would include two left turn and one right turn lane. The estimated cost for one mile of this cross section is \$3.6 million. For cost purposes, a grade separation is assumed every two miles at \$6.0 million each for an average per mile construction cost of \$6.6 million.

New Six-Lane Parkway

This cross section includes three travel lanes in each direction with a raised median. The right of way for this cross section is 130 feet and the roadway width is 94 feet. The cross section provides for 13-foot travel lanes and a 16-foot median. The outside features of the cross section include curb, gutter, and sidewalk. Selected major intersection along a parkway would be grade separated and all turning movements would be provided. The at-grade intersections would include two left turn and one right turn lane. The estimated cost for one mile of this cross section is \$5.4 million. For cost purposes, a grade separation is assumed every two miles at \$8.0 million each for an average per mile construction cost of \$9.4 million.

Convert Six-Lane Arterial To Parkway

The right of way for this cross section is 130 feet and the roadway width is 94 feet. The cross section includes three travel lanes in each direction with a raised median. The cross section provides for 13-foot travel lanes and a 16-foot median. The outside features of the cross section include curb, gutter, and sidewalk. Selected major intersection along a parkway would be grade separated and all turning movements would be provided. The at-grade intersections would include two left turn and one right turn lane. It is assumed that there is a nominal cost to convert the arterial segment to a parkway. For cost purposes, a grade separation is assumed every two miles at \$8.0 million each and each intersection reconstruction would cost \$2.0 million for an average per mile construction cost of \$5.0 million

Roadway System Improvements

There are two primary components to an effective street system. One is the capital component, which is the construction or improvement to the street and includes associated features such as landscape, lighting, signals, and other enhancements. The other component is the operation and maintenance of the street system, which includes pavement preservation and rehabilitation, traffic engineering, traffic safety education, and other street upgrades. It is interesting to note that policy T-4.1d states that operations and maintenance of the existing system is a priority before investing in new infrastructure.

The capital component of the preferred street system plan incorporates a combination of the different types of improvement projects that will address many of the capacity needs, system continuity requirements, and system maintenance. The resulting street plan showing the recommended number of lanes and location of intersection improvements is shown in Figure 4-9. The implementation of the street plan is expected to occur in phases over the next 25 years. A suggested priority for implementation of the plan is included later in this chapter. Actual implementation will depend on a number of factors including funding, freeway construction, cost sharing, joint projects, and development patterns.

The following is a summary of the improvement projects included in the plan.

Number of intersection improvements	20
New two-lane street	1.5 miles
New four-lane street.....	26 miles
New six-lane street.....	72.75 miles
Widen from four to six lanes.....	72.25 miles
New four-lane parkway	1 mile
New six-lane parkway	4.5 miles
Convert six-lane arterial to parkway	6.5 miles

It should be noted that the following three projects are conditional pending further analysis and public input.

- US 60 and Lindsay Road traffic interchange
- Loop 202 and Mesa Drive traffic interchange
- Higley Road Parkway

The operations and maintenance component is three separate functions.

- Streets-pavement management, which includes fog seal, overlay, and reconstruction projects to maintain the integrity and life of the pavement.
- Street operations and maintenance, which includes street sweeping, landscaping, shared-use paths, pedestrian enhancements, and in-house pavement and sidewalk projects.
- Traffic operations and maintenance, which includes technical staff, administration, studies, planning, signals, signs, street lights, pavement markings, and traffic safety education.

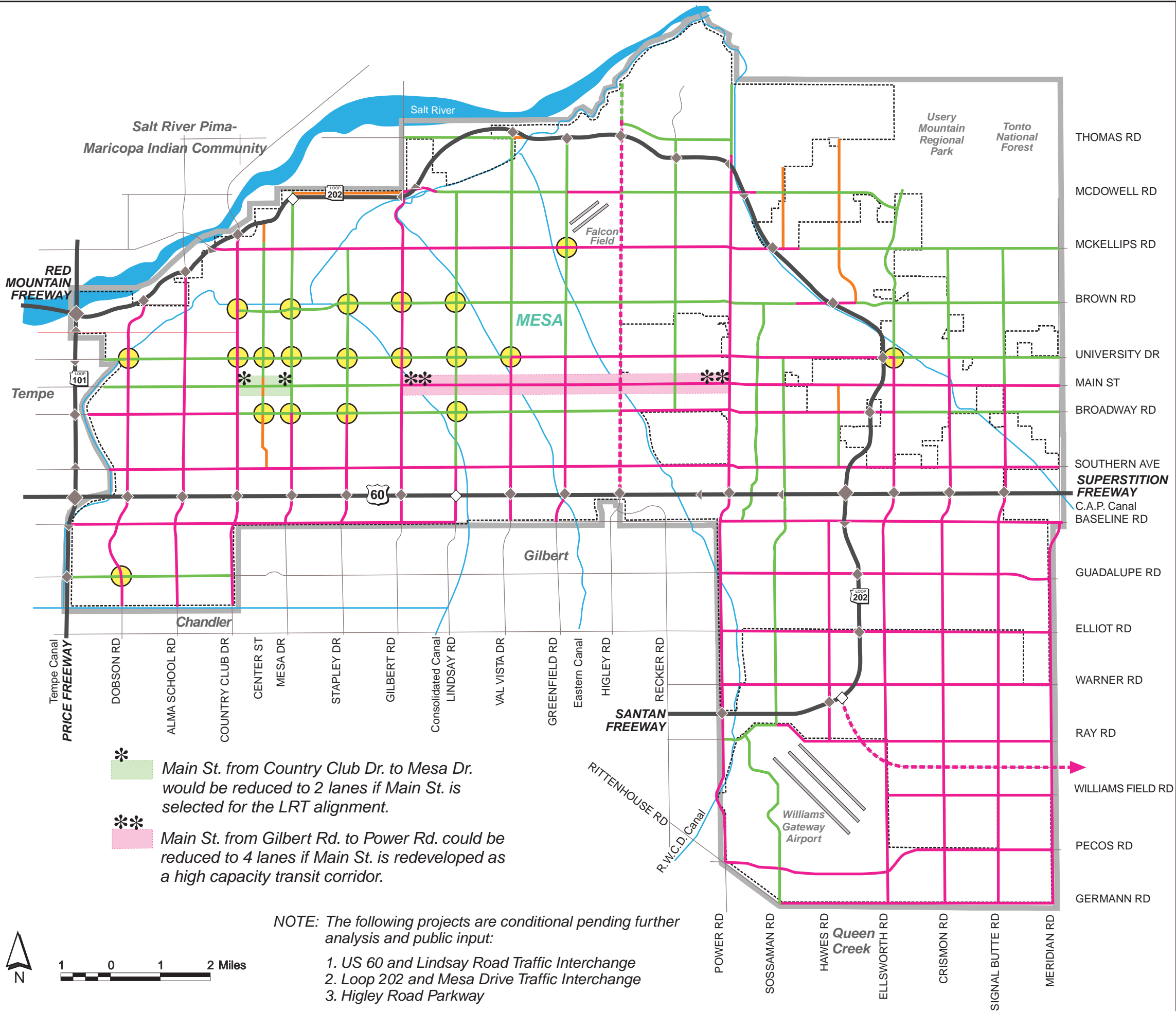
Transportation Plan



Recommended Street Plan

Figure 4-9

- Intersection Improvement
- 6 Lane Parkway
- 4 Lane Parkway
- 6 Lane Arterial
- 4 Lane Arterial/Collector
- 2 Lane Arterial/Collector
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



The recommended street system plan shown in Figure 4-9 was examined to determine the expected volume to capacity (v/c) ratio and Level of Service based on the buildout forecasts previously presented. The v/c ratios for those segments expected to operate at Level of Service E or F is shown in Figure 4-10. The number of segments is shown in Table 4-9. The analysis shows that 57 street segments would be operating at Level of Service E and that 14 street segments would be operating at Level of Service F.

Table 4-9
Preferred Street Plan Operational Summary

Level of Service	V/C Range	No. of Segments
E	0.77 to 0.90	48
E	0.90 to 0.99	9
F	1.0 to 1.10	13
F	greater than 1.10	1

The City of Mesa incorporates raised medians at selected locations on the arterial street system to provide access control and improve operations by minimizing mid-block left turns. A number of existing streets have a raised median and several more are recommended. Figure 4-11 shows the existing and proposed median locations.

A street system can be defined by the function of individual streets both from an access and mobility standpoint. The functional class for the preferred street system is presented in Figure 4-12.

Generally, the higher the functional class, the higher the level of mobility and the less direct access. Conversely, the lower the functional class, the lower the level of mobility and the more direct access. A freeway is considered the highest functional class since it provides good regional mobility and only has access at traffic interchanges. Local streets are considered the lowest functional class because the primary purpose is local access. Arterial streets primarily serve through traffic; however, they also have local access at driveways and intersecting streets. From a functional standpoint, a parkway is between a freeway and arterial street. Its primary function is mobility and through traffic, although it can provide limited access. A parkway will typically have a raised median, and it will have fewer crossroad intersections and traffic signals than an arterial street. A parkway can have grade separations at selected major crossroads in order to improve through traffic on the parkway. Access will still be provided at these locations using connector roads between the parkway and the crossroad.

Transportation Plan



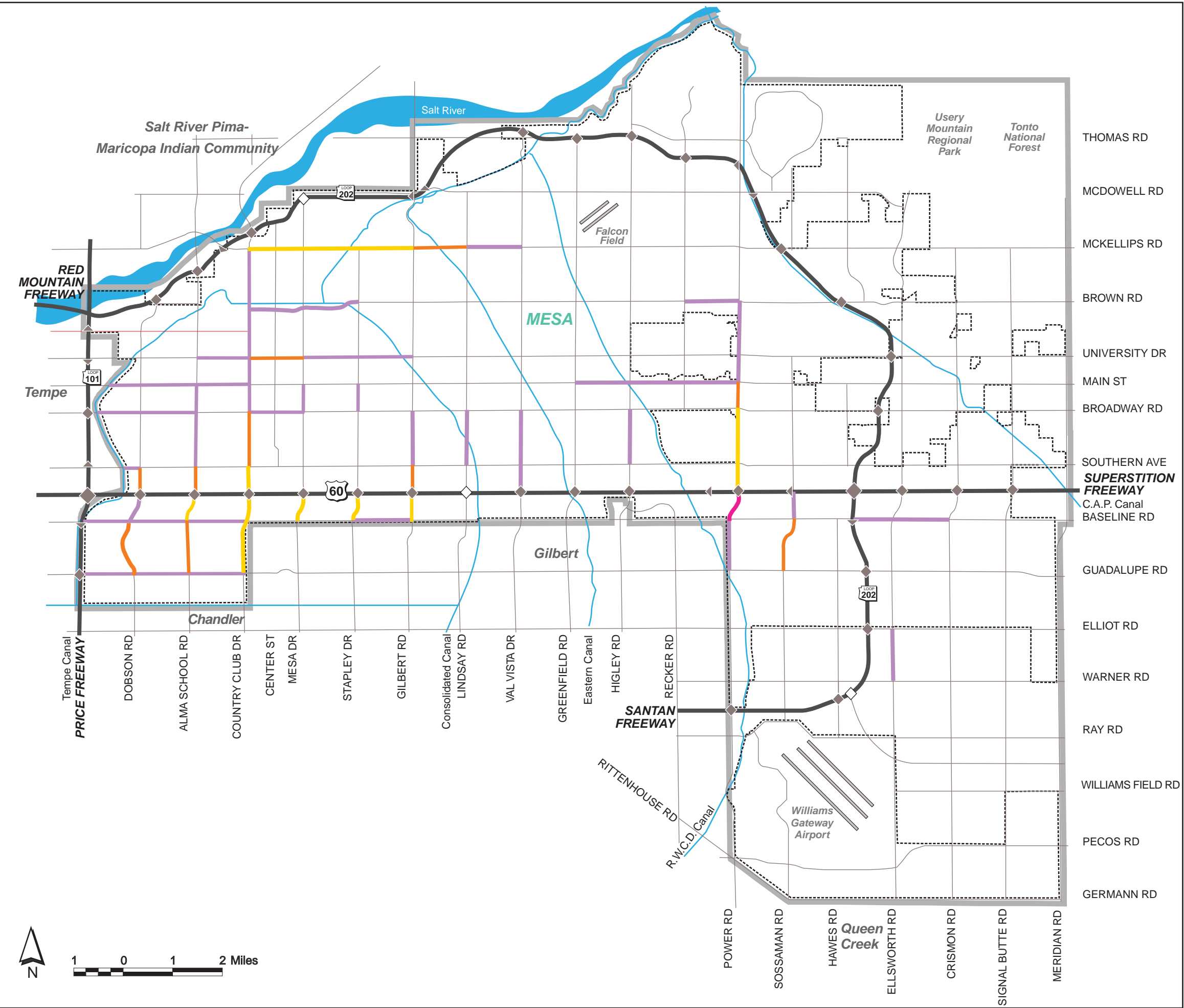
2025 Recommended Street Plan Level of Service

Figure 4-10

V/C Ratio = Volume to Capacity Ratio

0.77 - 1.0 = LOS E
> 1.0 = LOS F

- > 1.1
- 1.0 to 1.1
- 0.91 to 0.99
- 0.77 to 0.90
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



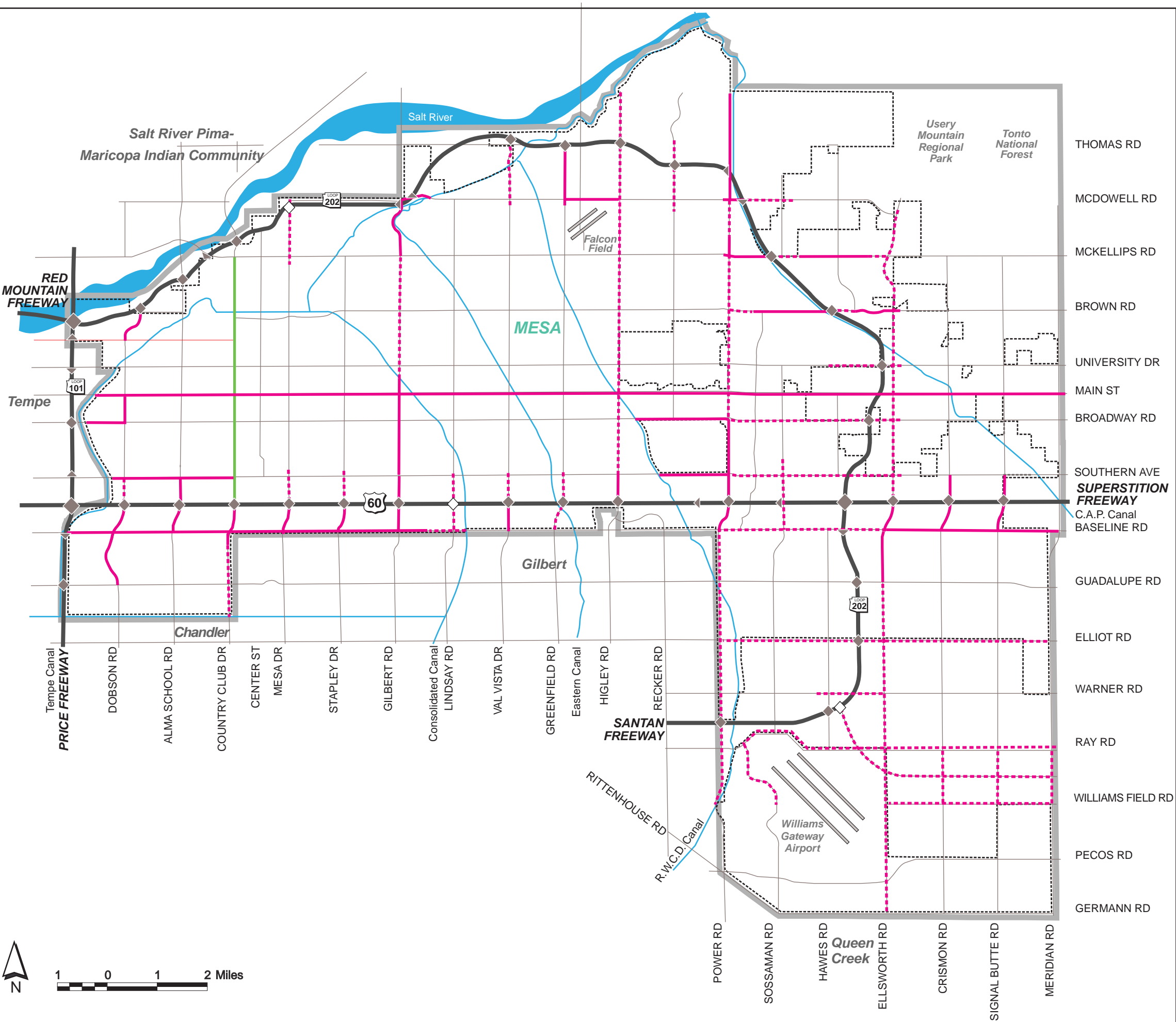
1 0 1 2 Miles

Transportation Plan



Median Island Locations

Figure 4-11



- Proposed Raised
- Existing Raised
- Existing at Grade
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



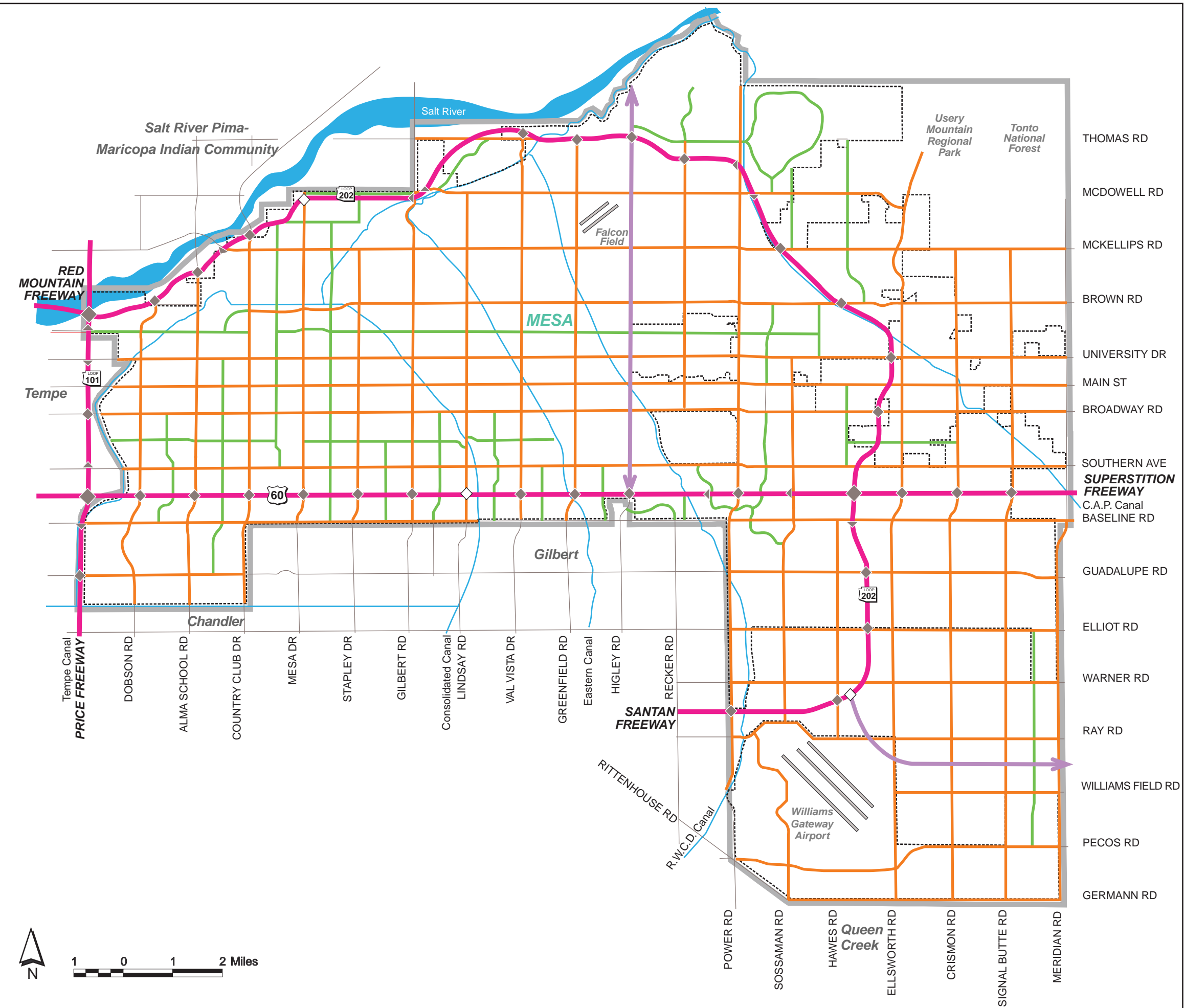
Transportation Plan



Functional Classification

Figure 4-12

- Freeway
- Parkway
- Arterial
- Major Collector
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



The preferred street plan and functional class map show two potential parkway facilities. One is in southeast Mesa near Williams Gateway Airport. The intent is for this facility to link with Loop 202 near the Hawes Road interchange and then extend southeasterly towards and possibly into Pinal County. The purpose of this facility is to address regional growth that is anticipated at Williams Gateway Airport and at the GM site. Additionally, such a facility would serve substantial growth that is occurring and planned in Pinal County. Although this facility is identified as a parkway, the City could partner with ADOT to develop it as a freeway, especially if the ½-cent regional sales tax is extended. The City has already initiated discussions with MAG and ADOT to identify this as a regional facility.

The other location identified as a potential parkway is Higley Road. Based on a previous study, the *North-South Corridor Transportation Planning Study*, several alternatives to accommodate traffic growth caused by the rapid increase in population and employment occurring in the Chandler-Gilbert-Mesa region were identified. The study focused on identifying additional high capacity north-south corridors to supplement the freeway system. Higley Road was recommended as a high capacity corridor as well as Mesa Drive. There has been little support for Mesa Drive as a high capacity corridor because of the limited right of way.

Higley Road still appears to be a viable corridor, especially if the Salt River Pima-Maricopa Indian Community implements its plan to extend Higley Road north across the Salt River to connect with SR 87. However, as was noted previously, additional analysis and public input is needed to further define the recommendation. The parkway concept could be implemented over time as conditions warrant. Initially, Higley Road would be widened to six lanes. Subsequently, if Higley Road is continued north to SR 87, certain access points could be eliminated and traffic signals removed to improve flow on Higley Road. Ultimately, grade separated intersections could be provided at selected major cross-streets to accommodate traffic demand on Higley Road.

Project Priority Groups

The street system plan has been divided into five priority groups, which represents years 1-5, 6-10, 11-15, 16-20, and 21-25. The groupings can also be defined as short range, medium range, and long range. Short range equates to priority 1 (years 1-5), medium range equates to priorities 2 & 3 (years 6-16), and long range equates to priorities 4 & 5 (years 16-25). The priorities for the street system plan were developed based on capacity needs, expected growth, freeway construction, continuity, and a general attempt to balance the priority group costs. Typically, the higher priority projects are in the western portion of the City where the Level of Service is already E and F, adjacent to freeway projects, and where other improvements have already been constructed. Table 4-10 summarizes the project type by priority.

Table 4-10
Street System Improvements by Project Type

	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5
Intersection improvements (#)	5	12	3		
New two-lane street (mi.)				1.5	
New four-lane street (mi.)	7	1	4	8	6
New six-lane street (mi.)	7.5	1	14.5	26.75	23
Widen from four to six lanes (mi.)	22.75	18	22	9.5	
New four-lane parkway (mi.)					1
New six-lane parkway (mi.)		4.5			
Convert arterial to parkway (mi.)					6.5

The priority of projects is preliminary and may be adjusted in the final plan. Subsequently, the City should review project priorities on a regular basis and make adjustments as appropriate to meet changing needs. The project priorities are shown in Figures 4-13 to 4-17 for the five groups.

Plan Cost

In addition to the cost to construct the preferred street plan projects, additional funding is allocated to the capital cost to address freeway enhancement, landscape enhancements, freeway acceleration, street lighting, neighborhood traffic management, intelligent transportation systems, and bridge rehabilitation. Also, there are costs associated with the operation and maintenance of the street system. Each of these cost items is summarized below.

Construction Cost

- The construction cost for priority 1 projects is \$142 million.
- The construction cost for priority 2 projects is \$139 million.
- The construction cost for priority 3 projects is \$169 million.
- The construction cost for priority 4 projects is \$184 million.
- The construction cost for priority 5 projects is \$154 million.

Other Capital Cost

- \$200,000 per year in priority groups 1-5 for arterial street lighting.
- \$500,000 per year in priority groups 1-5 for City share of street lighting.
- \$600,000 per year in priority groups 1-5 for City share of additional pavement width

- \$500,000 per year in priority groups 1-5 for new traffic signals and upgrades
- \$250,000 per year in priority groups 1-5 for miscellaneous street improvements
- \$200,000 per year in priority groups 1-5 for residential street lighting (spot improvements).
- \$250,000 per year in priority groups 1-5 for design
- \$1,000,000 per year is allocated in priority groups 1-2 for freeway enhancement (e.g. landscape, art, added turn lanes at interchanges).
- \$6,000,000 per year is allocated in priority group 2 for local partnering funds for Hawes Parkway and Traffic Interchange.
- \$300,000 per year is allocated in priority groups 1-5 for neighborhood street lighting (outside CDBG).
- \$500,000 per year is allocated in priority groups 1-5 for arterial street landscape rehabilitation.
- \$400,000 per year is allocated in priority groups 1-5 for neighborhood traffic management.
- \$500,000 per year is allocated in priority groups 1-5 for Intelligent Transportation Systems (ITS).
- \$500,000 per year is allocated in priority groups 3-5 for bridge rehabilitation.

Operations and Maintenance Cost

- The operations and maintenance cost for priority 1 is \$188 million.
- The operations and maintenance cost for priority 2 is \$177 million.
- The operations and maintenance cost for priority 3 is \$187 million.
- The operations and maintenance cost for priority 4 is \$205 million.
- The operations and maintenance cost for priority 5 is \$236 million.

Total Cost

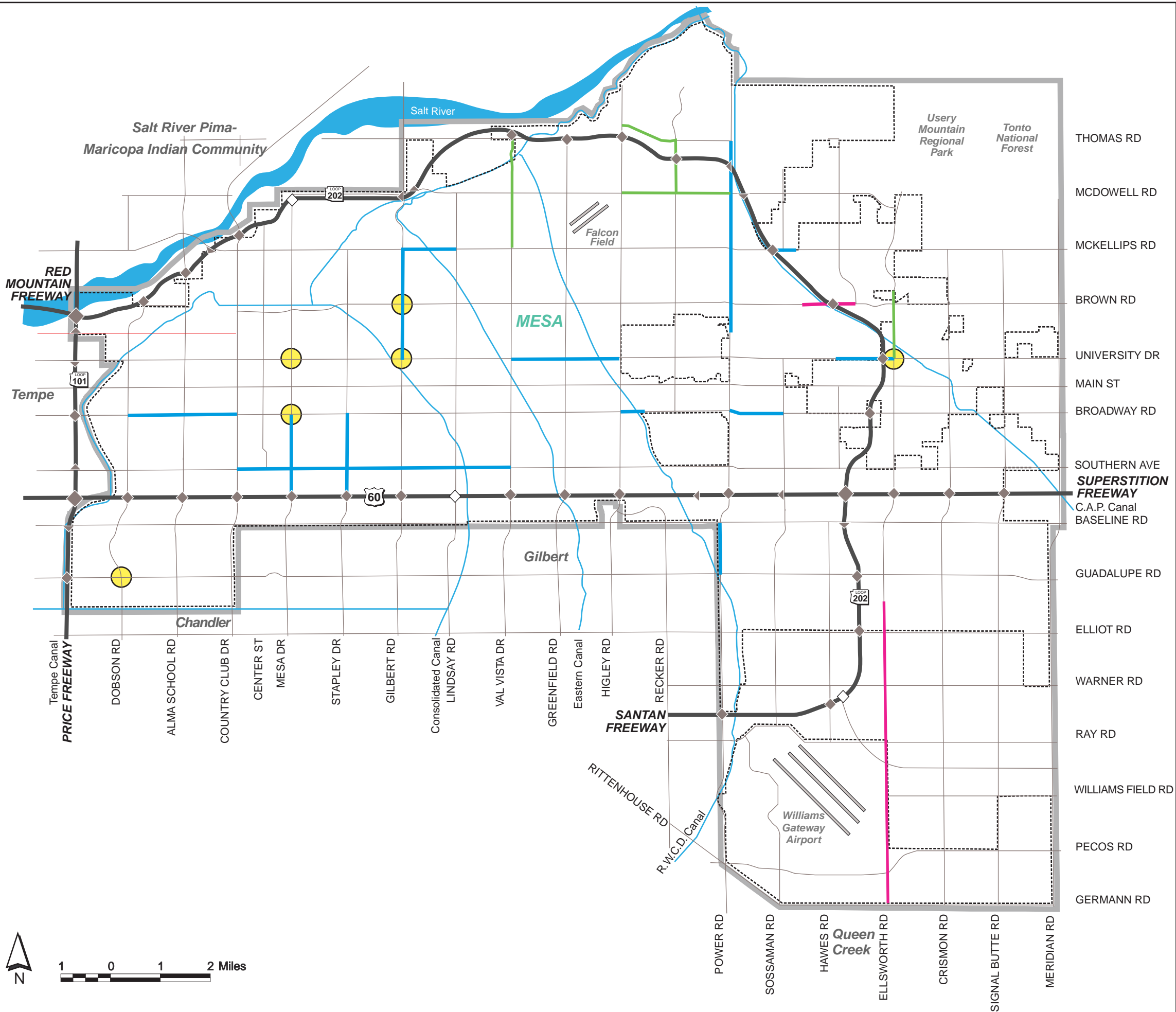
- The total cost for priority 1 is \$358 million.
- The total cost for priority 2 is \$383 million.
- The total cost for priority 3 is \$387 million.
- The total cost for priority 4 is \$414 million.
- The total cost for priority 5 is \$420 million.

Transportation Plan



Street Projects Priority 1

Figure 4-13



- 6 Lane
- Widen 4-6 Lane
- 4 Lane
- 2 Lane
- 6 Lane Parkway
- Intersection Improvement
- Freeway
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways

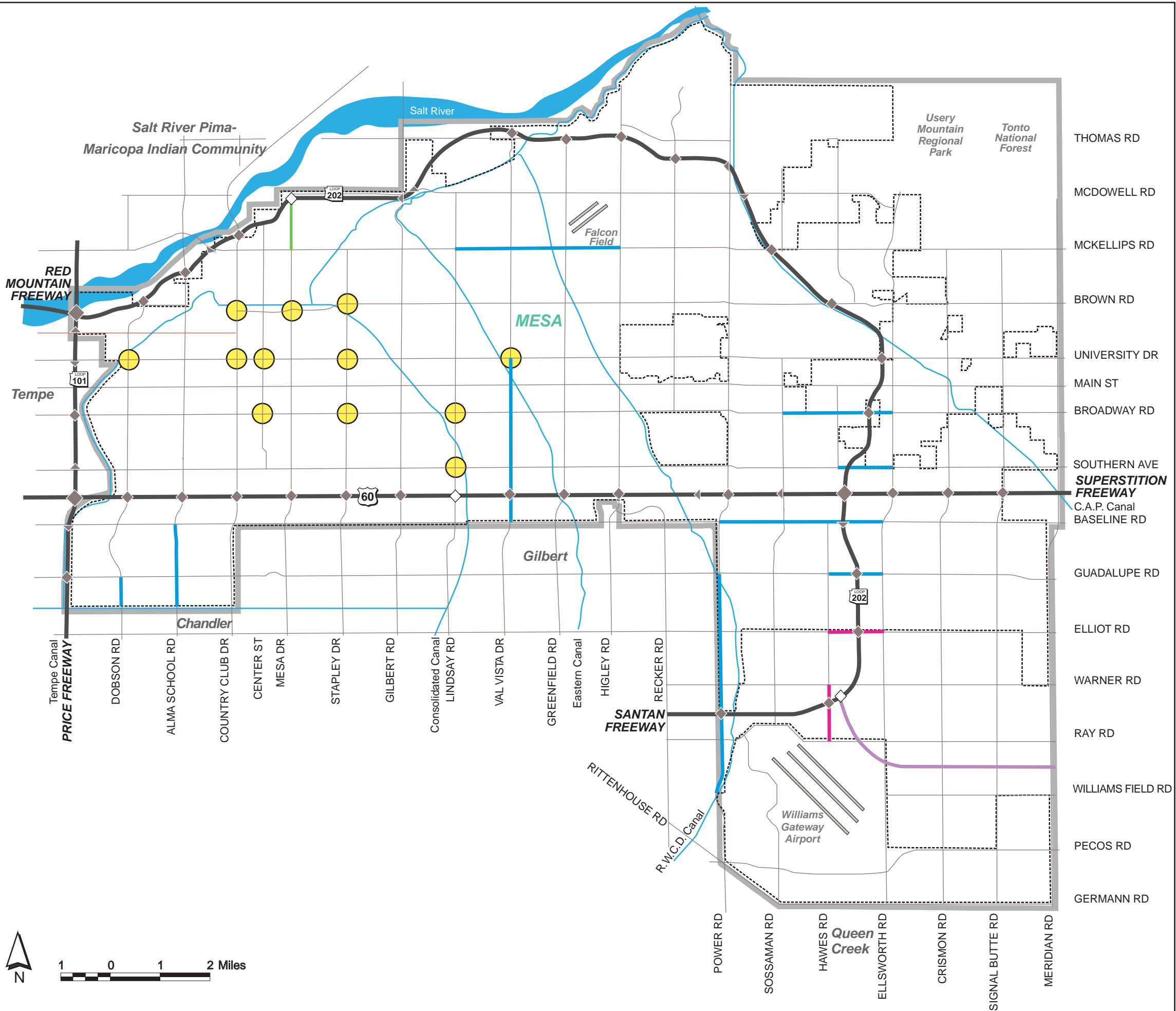


Transportation Plan



Street Projects Priority 2

Figure 4-14



- 6 Lane
- Widen 4-6 Lane
- 4 Lane
- 2 Lane
- 6 Lane Parkway
- Intersection Improvement
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



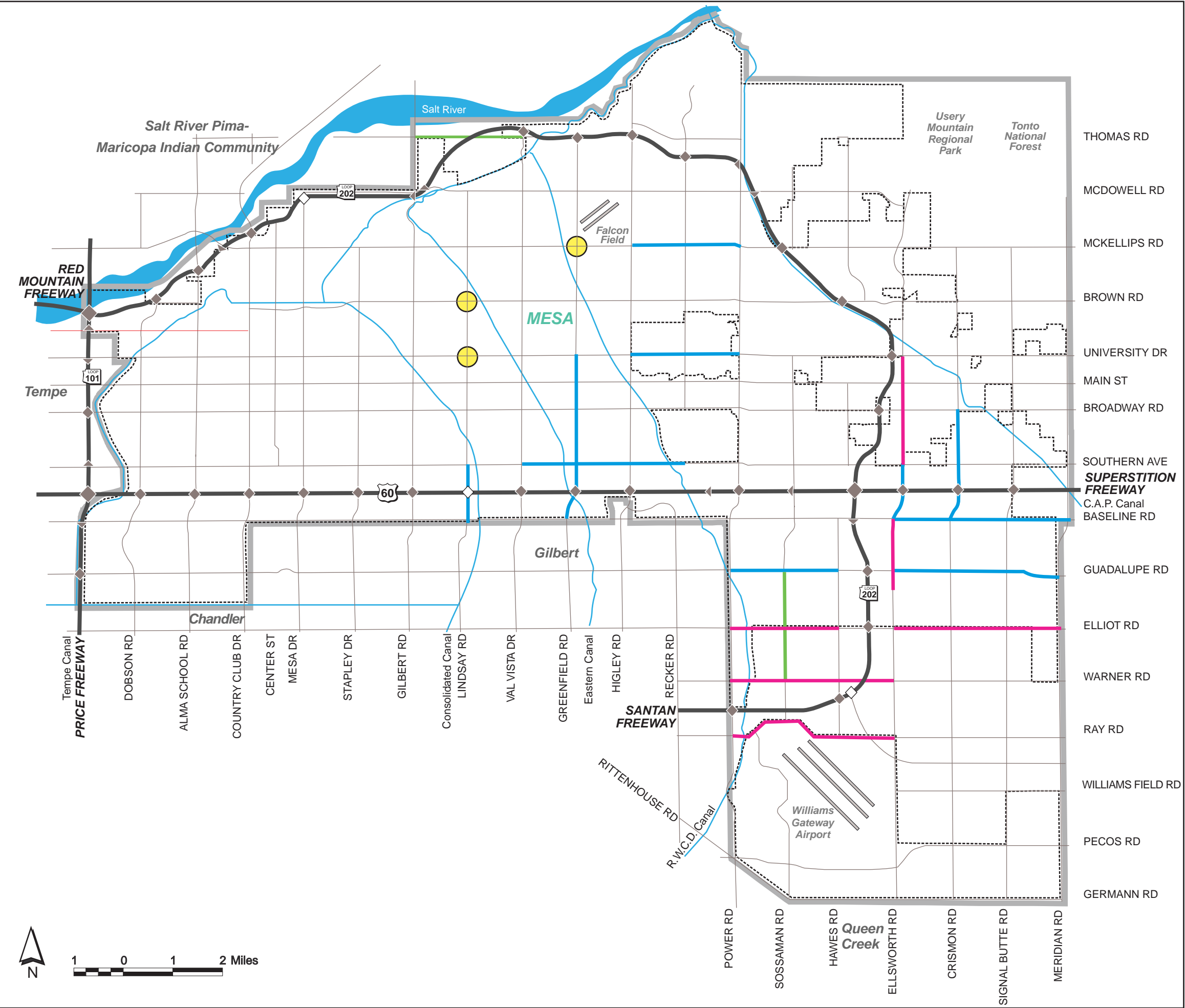
Transportation Plan



Street Projects Priority 3

Figure 4-15

- 6 Lane
- Widen 4-6 Lane
- 4 Lane
- 2 Lane
- 6 Lane Parkway
- Intersection Improvement
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



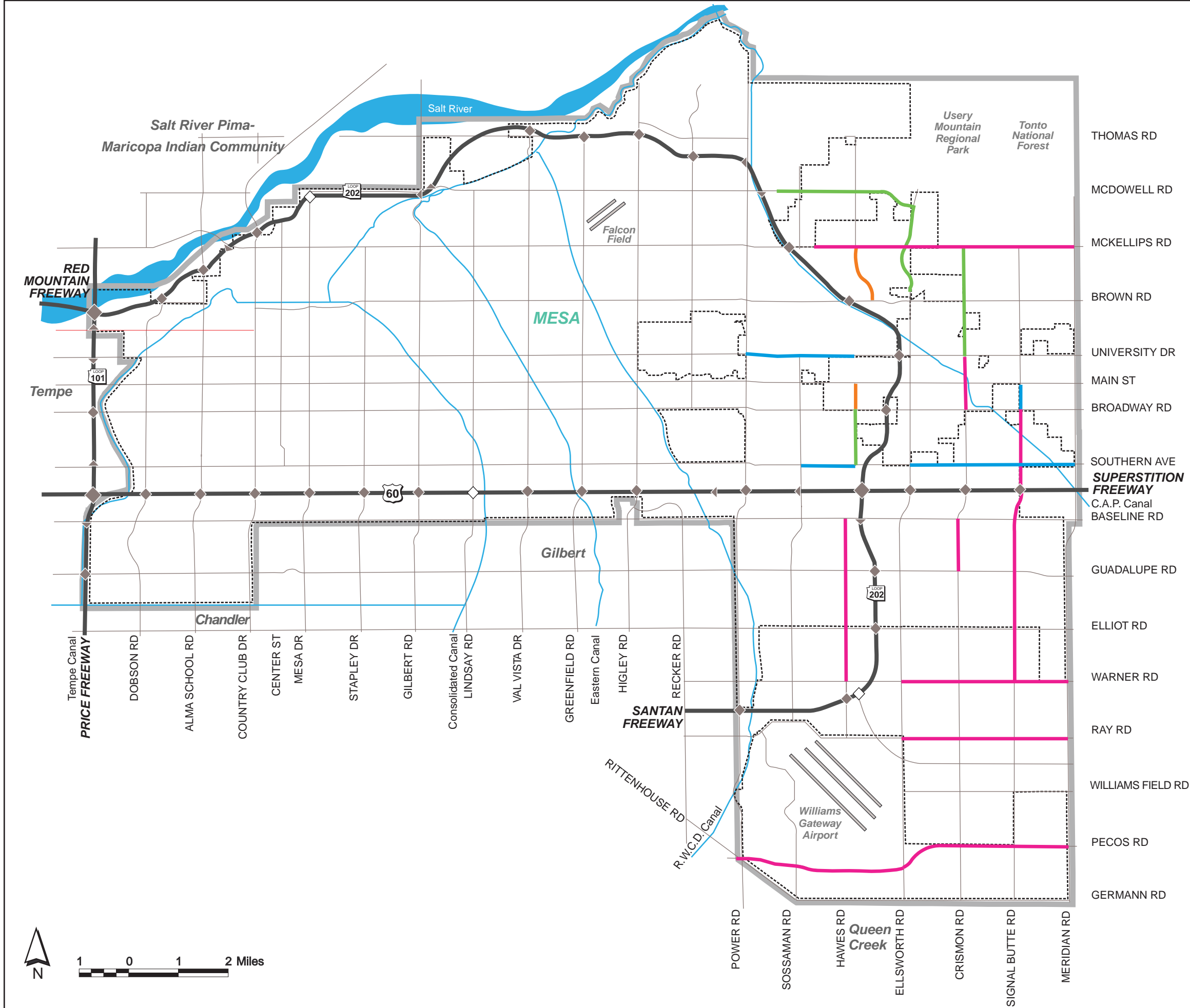
Transportation Plan



Street Projects Priority 4

Figure 4-16

- 6 Lane
- Widen 4-6 Lane
- 4 Lane
- 2 Lane
- 6 Lane Parkway
- 4 Lane Parkway
- Intersection Improvement
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



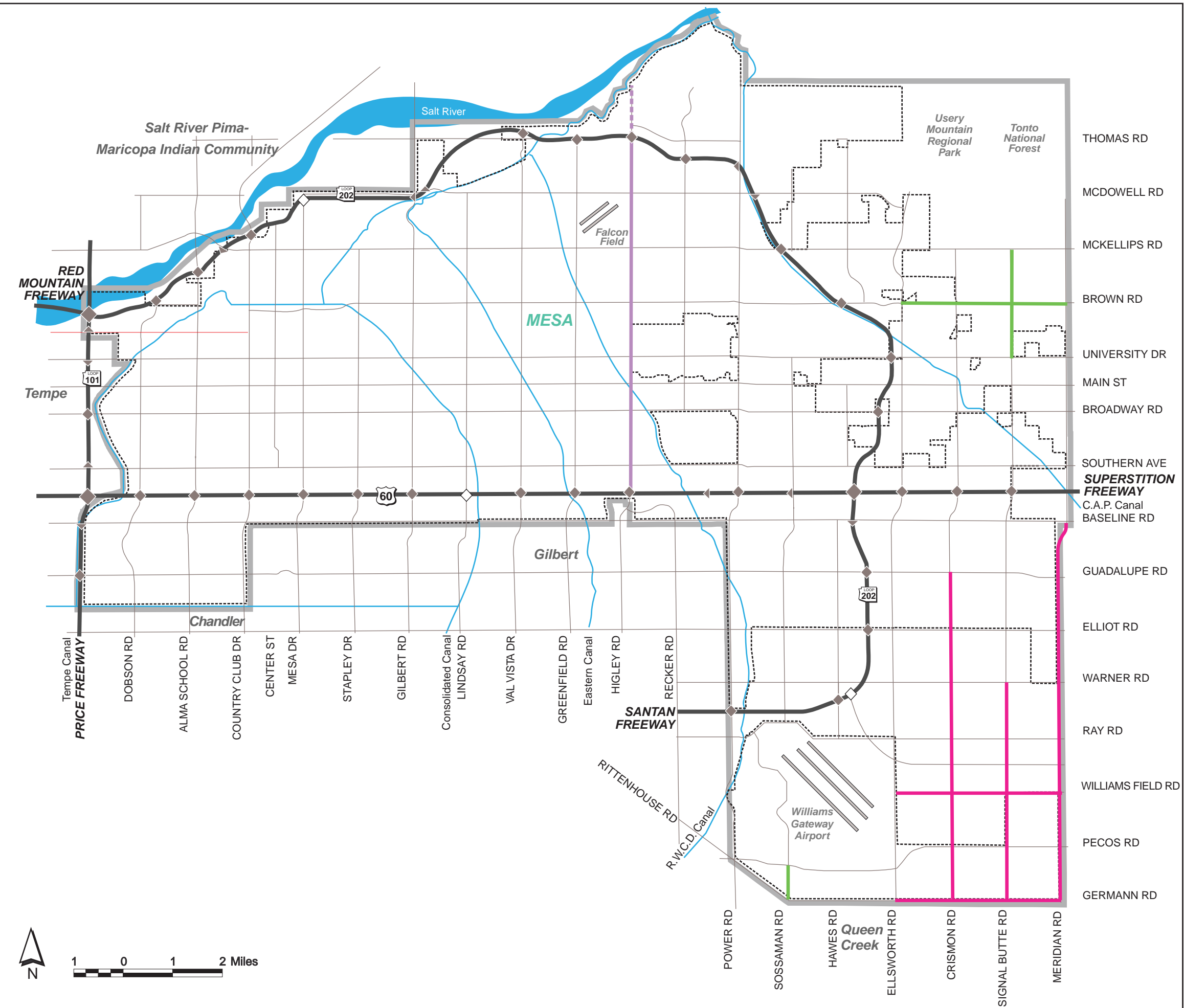
Transportation Plan



Street Projects Priority 5

Figure 4-17

- 6 Lane
- Widen 4-6 Lane
- 4 Lane
- 2 Lane
- 6 Lane Parkway
- 4 Lane Parkway
- Intersection Improvement
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



5.0 TRANSIT PLAN



Introduction

As the metropolitan area grows, transit will play an increasingly important role for Mesa and the region once the core freeway system is completed. Transit agencies are expected to increase service at a rate comparable to or faster than the rate of population growth for their service area.

As congestion increases, so will the need for a reliable transportation alternative. Like most other cities in region, the majority of Mesa's existing transit riders are transit dependent (i.e., 0 cars within the household). Improved transit service through expanded coverage and increased frequency, combined with the implementation of transit priority measures, will attract new discretionary riders.

Review of Previous Plans

Several earlier planning documents were examined to gain an understanding of future plans, zoning regulations, city statistical data, and transit service characteristics. They include:

- City of Mesa On-Board Quality Survey, 2002
- City of Mesa Transit Program Summary, March 2001
- City of Mesa Boarding and Alighting Study, February 2001
- Mesa Town Center Concept Plan, 1999

- Mesa Transit Center Study, July 1995
- Mesa Transit Facility Study (Draft Data Collection & Inventory Summary), December 1994
- City of Mesa General Plan, Revised 1994
- City of Mesa General Plan, 1988
- Central Phoenix/East Valley LRT Project DEIS, December 2001
- RPTA Regional Short Range Plan (FY 2000-2004), January 2000
- RPTA Long Range Transit Plan, June 1999
- Phoenix/Glendale Major Investment Study, February 1999
- City of Tempe Transit Referendum Plan, 1996

Peer City Review

This section compares transit service in the City of Mesa with cities of similar size and character throughout the United States. Table 5-1 compares transit service statistics for Mesa with cities of similar population rank based on the 2000 U.S. Census. In every category, the amount of transit service Mesa supplies and consumes is lower than that of peer cities.

**Table 5-1
Comparison of Transit Service Statistics**

Rank	City	2000 Pop.	Vehicles Operated in Max Service	Transit Service Supplied (in 000's)				Transit Service Consumed (in 000's)	
				Annual Vehicle Miles	Annual Vehicle Revenue Miles	Annual Vehicle Hours	Annual Vehicle Revenue Hours	Annual Unlinked Passenger Trips	Annual Passenger Miles
35	Albuquerque, NM	448,607	104	4,844	4,077	298	243	6,224	203,667
37	Fresno, CA	427,652	84	4,262	3,966	328	295	12,419	42,308
43	Mesa, AZ	396,375	23	1,235	1,122	81	72	791	2,769
44	Tulsa, OK	393,049	70	2,151	2,811	205	196	30,867	16,924
45	Omaha, NE	390,007	104	4,051	3,689	298	281	4,276	15,735
49	Colorado Springs, CO	360,890	43	2,386	2,187	147	140	3,669	14,644
51	Wichita, KS	344,284	41	1,687	1,606	109	102	2,542	10,622
57	Toledo, OH	313,619	146	4,314	3,610	312	221	4,543	21,697

Source: 2000 U.S. Census, Incorporated Places of 100,000 or More, Ranked by Population. 2000 National Transit Database

While Mesa may be closest in population to the cities described in Table 5-1, its transit market may be more similar to the peer cities described in Table 5-2. The comparison of transit service standards includes two peer cities under the Valley Metro “service umbrella” (Chandler, Tempe) and four cities that have a similar standing to Mesa in their respective metropolitan areas. As with transit service statistics, Mesa’s transit service standards are much lower when compared with its peer cities.

Table 5-2
Comparison of Transit Service Standards

City	2000 Pop.	Revenue Miles (2000 NTD)	Operating Expenses (2000 NTD)	Local Bus					Express Bus		Transfers
				Hours		Frequency			# Trips	Freq.	
				Mon - Sat	Sun	Mon - Fri	Sat	Sun			
Mesa	396,375	1,122,480	\$3,841,811	5am – 10pm	5am - 10pm	15/30	30-60		10	30/60	Free with paid fare
Chandler, AZ	176,581	-	-	4:30am - 9:45pm	4:30am - 11:45pm	15/30	30/60	60	10	30	Free with paid fare
Tempe, AZ	158,625	2,353,878	\$8,661,773	4:30am – 1am	5am - 12am	15/30	30/60	30/60	9	30	Free with paid fare
Oakland, CA	399,484	21,518,146	\$179,054,321	5:30am - 9:30pm	7am – 7pm	15/30	60	60	-	30	\$0.25 good for unlimited transfer up to hour
St. Paul, MN	287,151	25,153,334	\$168,935,338	5:00am - 1:00am	5:30am - 1:00am	10/30	30	30/60	-	30	Free unlimited transfers for 2 ½ hrs
Aurora, CO	276,393	36,137,226	\$211,120,590	5:30am - 2:00am	6:00am - 8:00pm	30/60	60	60	-	30	Free transfer up to an hour
Bellevue, WA	109,569	-	-	5:30am – 1am	6:30am – 12:30am	15/30	30	30	50	15	Free transfer up to 3 hours

Source: S.R. Beard & Associates, 2002

Transit Technology

This section includes an overview of available transit technologies.

Neighborhood Circulators

Neighborhood circulators focus on serving a common geographic area. The vehicles are small and enable passengers to connect to a wider transit network from residential neighborhoods and activity centers. Circulators usually offer all-day, frequent service. Local examples include downtown Phoenix (DASH) and downtown Tempe (FLASH), which operate on 10-minute frequencies.



Fixed Route Service

Fixed route service is the most common form of transit service in the City of Mesa and the region. It uses standard size transit vehicles (usually 40-foot buses) and is generally characterized by buses operating along the major arterial grid network of streets. The vehicles make frequent stops and may require passengers to transfer in order to reach their destinations. Service frequencies tend to range from 15 to 30 minutes.



Express Bus

Express buses operate as commuter service during the peak travel period and usually connect suburbs with central business districts. The routes typically serve park-and-ride lots and may parallel local service but with fewer stops. Vehicles may include additional amenities such as overhead lighting and high-back seats. Express bus service usually operates over a peak period, such as 5 a.m. to 9 a.m. and 3 p.m. to 7 p.m.



Paratransit

Paratransit provides transportation for those unable to access traditional fixed route service, such as seniors and passengers with disabilities. The Americans with Disabilities Act (ADA) requires that complementary paratransit service be provided in all areas within $\frac{3}{4}$ of a mile of fixed route bus service. Extended service hours are usually provided for individuals who qualify under ADA.



Bus Rapid Transit

Bus rapid transit (BRT) uses dedicated or shared guideway to provide fast, frequent, and convenient transit service for medium to heavy travel demand corridors. Traffic signal priority is given to BRT vehicles operating in designated bus or high occupancy vehicle lanes.



Light Rail Transit

Light rail transit (LRT) is electrically powered, high capacity transit service operating on fixed guideway. It operates all-day on two sets of tracks with trains of up to three cars traveling in both directions. LRT typically runs 18 to 20 hours per day and stops at stations located approximately every mile. A 20.3-mile starter segment of the new Central Phoenix/East Valley Light Rail Transit Project will begin operating in late 2006. The starter segment will run from Phoenix, through downtown Tempe, and into Mesa where it will terminate near Main Street and Longmore.



Commuter Rail

Commuter rail is a regional passenger rail service operating during peak hours between a central city, its suburbs and/or another central city in heavy demand travel corridors. It is traditionally powered by a diesel-powered locomotive, and typically shares railroad mainline tracks with freight operations. Commuter rail makes stops less frequently than light rail, usually travels longer distances, and is designed to interface with other transit options at station areas.



Existing Transit Conditions

This section documents the existing transit conditions in the City of Mesa. The majority of the statistics presented in this document are from the two most recent reporting years, Fiscal Year (FY) 1998-1999 and FY 1999-2000. Data from other fiscal years has been included where appropriate.

Fixed Route Service

Multiple service providers that operate under the name “Valley Metro” fund fixed route transit service in Mesa. The City of Mesa is the primary service provider; although the Regional Public Transportation Authority (RPTA) helps fund a major regional route and three express bus routes. The Town of Gilbert funds a route, which extend into parts of Mesa. Data in this section is presented in two ways. Some data refers directly to those services that are directly contracted and operated by the City of Mesa, while other data represents services that are provided in Mesa, but are either not funded or directly operated by the City of Mesa. Table 5-3 lists the service provider by route.

Table 5-3
Existing Transit Service in Mesa

				Headway		
Route	Name	Funded By	Contracted By	Weekday Peak/Off-Peak	Saturday	Sunday
Local Bus Routes						
R	Red Line	RPTA	Phoenix	30	30	n/a
30	University	Mesa	Mesa	30	30	n/a
45	Broadway	Mesa	Tempe	30	30	n/a
61	Southern	Mesa	RPTA	30	30	n/a
77	Baseline	Mesa	Tempe	30	30/60	n/a
96	Dobson	Mesa	Mesa	30	30	n/a
104	Alma School	Mesa	Mesa	30	30	n/a
108	Elliot	Gilbert	RPTA	60	60	n/a ¹
112	Country Club	RPTA	RPTA	30	30	n/a
120	Mesa Drive	Mesa	Mesa	30	30	n/a
128	Stapley	Mesa	Mesa	30	30	n/a
136	Gilbert Road	Mesa	Mesa	30	30	n/a
Express Bus Routes						
531	Mesa/Gilbert	RPTA	Phoenix	5 trips	n/a	n/a
532	Mesa	RPTA	Phoenix	3 trips	n/a	n/a
533	Mesa	Mesa	Phoenix	2 trips	n/a	n/a
541	Chandler	RPTA	Phoenix	5 trips	n/a	n/a

Source: City of Mesa, 2001. ¹Sunday service terminates in Mesa near Gilbert border at Superstition Springs Mall.

Service Characteristics

Twelve (12) local routes and four (4) express routes are operated in Mesa each weekday, as illustrated in Figure 5-1. In most cases, weekday transit service is operated from 5 a.m. to 10 p.m. with 30-minute frequency. Express bus service operates in the peak hour only and provides connections between Mesa and downtown Phoenix. Saturday service in Mesa is restricted to local routes only, with service from 5 a.m. to 10 p.m. and headways of 30 to 60 minutes. No Sunday service is provided in Mesa.

Transportation Plan

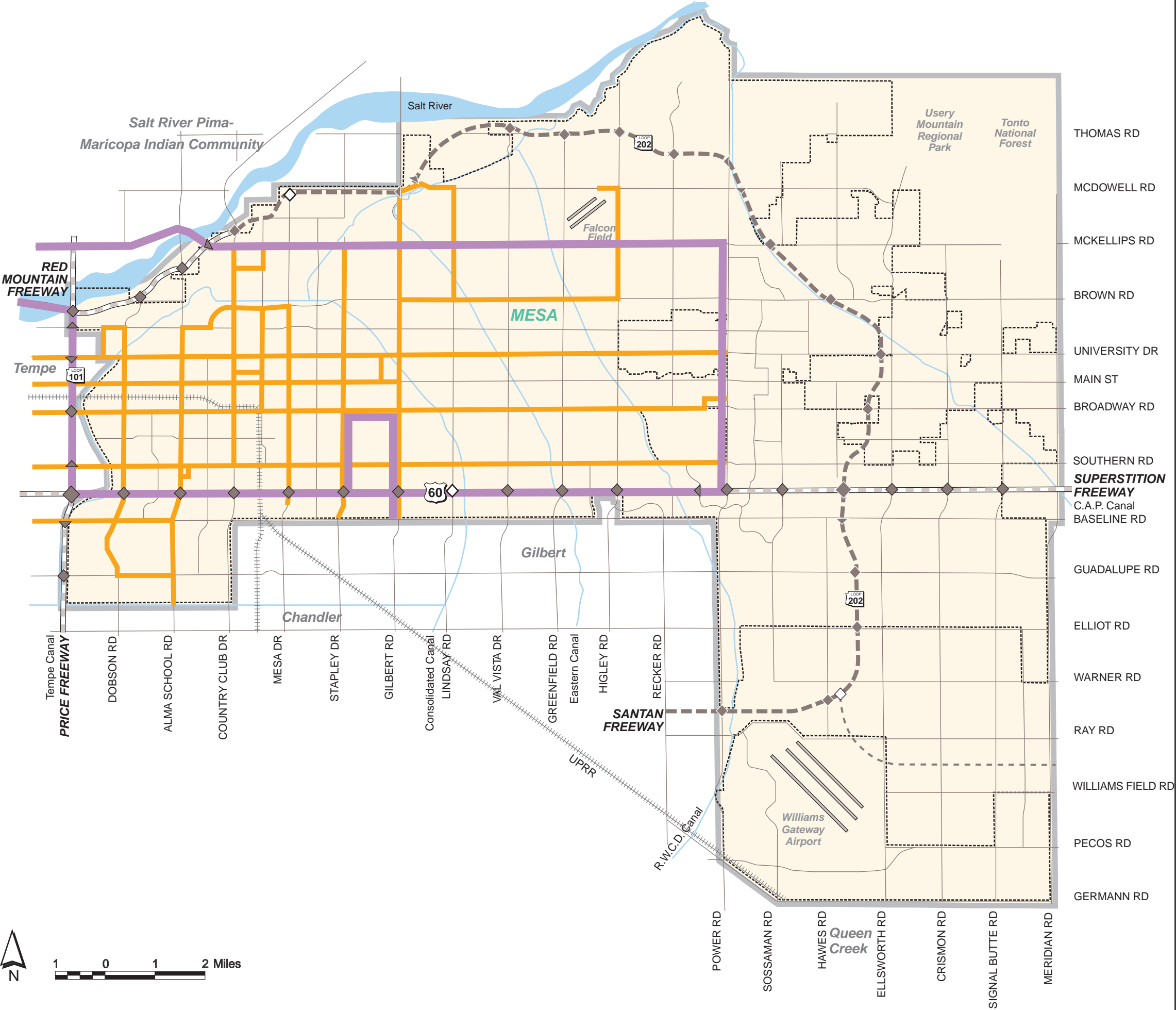


Existing Transit Service

Figure 5-1

- Existing Local Bus
- Existing Express Bus

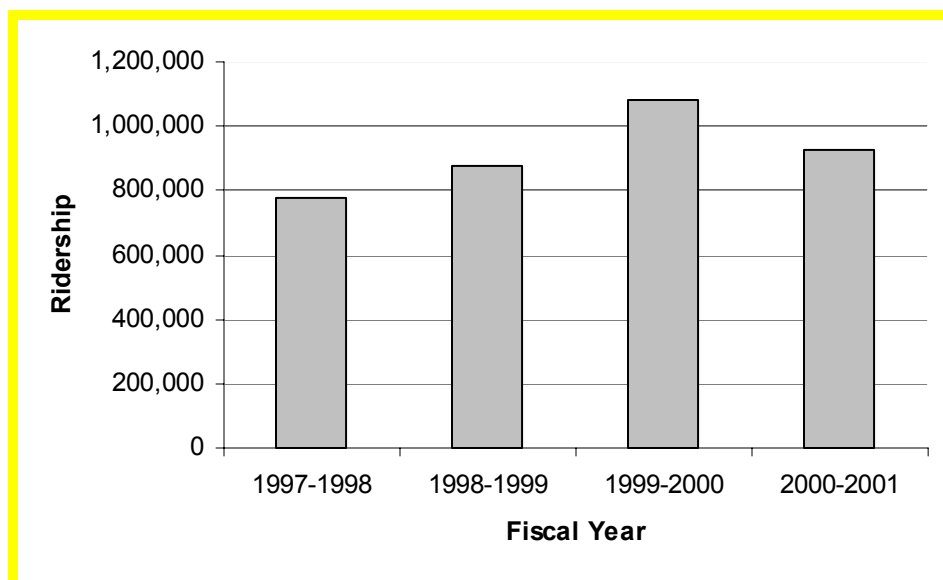
- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



Performance Characteristics

Since multiple service providers fund transit in Mesa, the availability of statistical data varies. According to the City of Mesa, Mesa funded public transit carried a total of 1,082,764 passengers during FY 1999-2000. This was the first time ridership in Mesa exceeded one million. Historical ridership data for the City of Mesa is displayed in Figure 5-2.

Figure 5-2
Mesa Historical Ridership Data



During FY 2000-2001, City of Mesa fixed route service vehicles drove 1,345,939 miles for a total of 91,721 hours. Table 5-4 shows historical data for total boardings, revenue miles, and revenue hours for the City of Mesa.

Table 5-4
Mesa Fixed Route Performance Statistics

Fiscal Year	Total Boardings	Revenue Miles	Revenue Hours
1997-1998	776,777	1,103,956	75,242
1998-1999	877,758	1,105,387	73,967
1999-2000	1,082,764	1,158,240	82,226
2000-2001	925,390	1,345,939	91,721

Source: City of Mesa, 2001

Fixed Route Performance Evaluation

The City of Mesa and the Regional Public Transportation Authority have provided fixed route data presented in this section.

Ridership By Individual Routes By Category

General system performance indicators may not reflect what is occurring on individual routes. Table 5-5 details ridership characteristics for FY 1998-1999 on individual local and express routes. Information on trips, vehicle miles, hours, and boardings is included. The best weekday performance occurs in Mesa on the following routes Red Line (Main St), 112 (Country Club), 30 (University Dr) and 61 (Southern Ave).

Table 5-5
Fixed Route Weekday Performance (FY 1998-1999)

Route	Vehicle Miles	Total Boardings	Transfers	Percent Transfers	Boardings Per Mile
Local Bus Routes					
R	414	1,323	403	30.5%	3.2
30	731	1,410	446	31.6%	1.9
45	987	1,118	353	31.6%	1.1
61	281	547	143	26.1%	1.9
77	343	274	11	4.0%	0.8
96	323	474	180	38.0%	1.5
104	330	524	200	38.2%	1.6
108	58	16	5	31.3%	0.3
112	386	759	254	33.5%	2.0
120	353	321	123	38.3%	0.9
136	500	349	126	36.1%	0.7
Express Bus Routes					
531	88	82	0	0.0%	0.9
532	82	81	1	1.2%	1.0
533	54	57	0	0.0%	1.1
541	34	41	0	0.0%	1.2

Source: RPTA, 2000. Routes 30 and 45 include data from former routes 31 and 46.

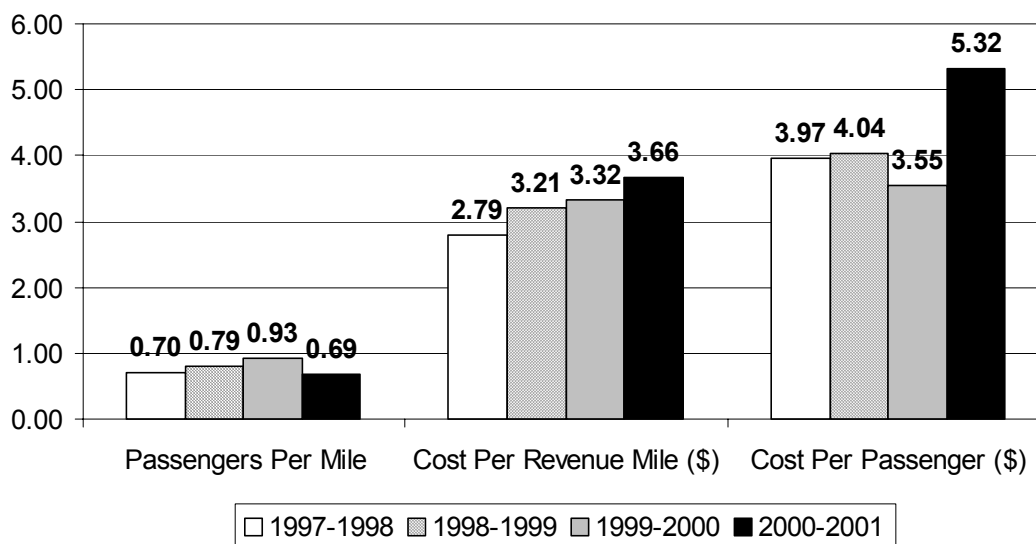
Transfers

Transfer information by route for FY 1999-2000 can also be found in Table 5-5. Transfers are much more common on local routes than express routes, with approximately 30 percent of boardings on local routes being transfers. The greatest number of transfers occurs on the Red Line, which travels east/west on Main Street in Mesa and provides frequent regional service to Tempe, Phoenix Sky Harbor Airport, downtown Phoenix, and Metrocenter. Major transfer points are given priority for passenger amenities such as bus shelters, seating, and schedule information.

System Performance Analysis

The following comparison of key performance indicators is based upon FY 2000-2001 data for the fixed route bus service for which the City of Mesa directly contracts. Bus services provided by or contracted by other communities/agencies within the region are not included in the data presented in this section. The data reveals that the City of Mesa carried an average of 0.69 passengers per mile during FY 2000-2001. Over the same period, cost per mile was \$3.66 and the operating cost per passenger was \$5.32. The increase in the cost per passenger in FY 2000-2001 was expected because of a significant increase in revenue miles from the addition of new service on Southern Avenue. Figure 5-3 graphically illustrates a comparison of these statistics over a three-year period.

**Figure 5-3
Fixed Route Performance Comparison**



Schedule Adherence

The City of Mesa and the RPTA regularly monitor on-time performance at major intersections throughout the service delivery area. Table 5-6 contains data, where available, of on-time performance survey results for Mesa fixed route service conducted in FY 1998-99.

Table 5-6
On-Time Performance Analysis for Selected Routes (FY 1998-1999)

Route	Trips Checked	On-Time*	Percent On-Time*
Local Bus Routes			
R	259	242	93.4%
61	809	739	91.3%
108	28	23	82.1%
112	545	424	77.8%
Express Bus Routes			
531	30	27	90.0%
532	18	18	100.0%
533	12	10	83.3%

Source: RPTA, 2000. *On-Time is defined as 0 to 5 minutes of scheduled departure

Paratransit Service

One paratransit service available in Mesa is the East Valley Dial-a-Ride, which is a partnership among the following six public agencies: City of Mesa, City of Chandler, City of Tempe, City of Scottsdale, Town of Gilbert, and the RPTA. In October 1999, the cities entered into a single contract with the RPTA for the management and operation of dial-a-ride services. Prior to this, the Mesa/Chandler/Gilbert Dial-a-Ride operated under a separate contract from the Tempe/Scottsdale Dial-a-Ride. The East Valley Dial-a-Ride allows for a single service area and provides services for ADA-certified passengers, seniors, and passengers with disabilities.

Dial-a-ride service in Mesa operates weekdays from 7 a.m. until 7 p.m., and weekends and holidays from 7 a.m. until 7:00 p.m. Extended service hours are provided for individuals who qualify under the Americans with Disabilities Act (ADA). According to the RPTA, the East Valley Dial-a-ride carried 170,653 passengers between November 1999 and July 2000. Of this amount, 88,788 passengers (52 percent) were carried in the City of Mesa.

The City of Mesa also provides paratransit service through its Enabling Transportation Program, a partnership with Mesa Senior Services, Inc. The Enabling Transportation (ET) program is a volunteer-based transportation system. Registered participants are provided a mileage reimbursement used to pay their volunteer driver. ET is designed to serve the elderly and disabled adult members of the community.

Transit Facilities

The City of Mesa owns and maintains a wide range of transit capital and infrastructure ranging from bus stops to transit vehicles. There are an estimated 632 bus stops located throughout the City, including one passenger transfer facility. The passenger transfer facility, which consists of a multi-bay bus pull-out and three passenger shelters is located at the Mesa Senior Center at 247 N. MacDonald.

In addition to passenger facility infrastructure, the City also owns and maintains a fleet of vehicles used for fixed route bus service and paratransit service (dial-a-ride). The City is currently storing and maintaining a majority of the vehicles at the East Mesa Service Center. However, a new bus operations and maintenance facility will be constructed near Greenfield Road and Virginia Street. Table 5-7 provides an inventory of the existing passenger, maintenance, and park-and-ride facilities in Mesa.

Table 5-7
Mesa Transit Facilities

Facility	Function	Route Served By	Comment
Mesa Senior Center 247 N. Macdonald	Passenger Transfer Center	30, 45, 104, 120	Three passenger shelters on site.
East Mesa Service Center 6935 E. Decatur Street	Operations & Maintenance	30, 532	Heavy vehicle maintenance, CNG and diesel fueling, and vehicle cleaning. Public park-and-ride spaces available.
Bus Operations Base 4811 E. Julep Street	Park-and-Ride Maintenance	136	Contractor-leased operations facility. Light vehicle maintenance.
Superstition Springs Mall Power Road/Southern Avenue	Park-and-Ride	30, 45, 61, 108, 533	Public park-and-ride spaces available.

Source: City of Mesa, 2001

Short-Term Transit Improvements

The short-term transit plan is based on the City of Mesa's existing land use plan and includes improvements to transit services and facilities in years 1 through 5. Increased local and express bus service will improve coverage while new transit facilities will enhance rider amenities.

Transit Service

The short term transit improvements are described in Table 5-8 and illustrated in Figure 5-4.

Local and Express Bus Routes

In the short term, new routes should be added and existing routes modified to provide complete coverage on Mesa's east/west arterials between the Tempe/Mesa border and Power Road. New service should be introduced on McKellips Road and Brown Road while existing service on Baseline Road would be extended east from Dobson Road to Power Road. The Red Line on Main Street should be extended past Power to Ellsworth Road from its current terminus at Gilbert Road. North/south service in Mesa will improve as existing Route 104 on Alma School will be extended south from Southern Road into Chandler while Route 112 will be modified to offer continuous service on Country Club Drive between McKellips and Frye Road in Chandler

**Table 5-8
Short Term Transit Improvements**

Route	Name	New, Modify Existing, Discontinue, or No Change	Route Description	2001 Headway Peak/ Off-Peak	Short Term Headway Peak/ Off-Peak
Local Bus Routes					
R	Red Line	Modify Existing	Extend east from Gilbert Road to Ellsworth Road. Discontinue service west of EVIT when LRT is constructed.	15/30	No Change
30	University	No Change	No Change	30	15/30
45	Broadway	No Change	No Change	15/30	No Change
61	Southern	No Change	No Change	15/30	No Change
77	Baseline	Modify Existing	Extend east from Dobson Road to Power Road and Superstition Springs Mall.	15/30	No Change
96	Dobson	No Change	No Change	15/30	No Change
104	Alma School	Modify Existing	Extend south from Southern to Chandler (segment south of Western Canal would be funded by Chandler).	15/30	No Change
112	Country Club	Modify Existing	Discontinue service on Alma School (Replaced with the extension of Route 104). Extend route south to Chandler (segment south of Western Canal would be funded by Chandler).	30	15/30
120	Mesa Drive	No Change	No Change	30	No Change
128	Stapley	No Change	No Change	30	No Change
136	Gilbert Road	No Change	No Change	30	No Change
McK	McKellips	New	Add new service between Mesa Town Center and Power Road via Center Street and McKellips Road.	n/a	30
Brown	Brown	New	Add new east/west service on Brown Road between Date and Multi-Generation Center.	n/a	30
Power	Power	New	New service on Power Road between Superstition Springs and McKellips Road.	n/a	30
Express Bus Routes					
531	Mesa/Gilbert	No Change	No Change	5 trips	No Change
532	Mesa	No Change	No Change	3 trips	No Change
533	Mesa	No Change	No Change	2 trips	No Change
541	Chandler	No Change	No Change	5 trips	No Change
Light Rail Transit					
LRT	CP/EV LRT	New	New LRT service between Phoenix and Mesa via Tempe. Initial segment will terminate at Main and Longmore with future extension to Mesa Town Center.	n/a	10/20
Neighborhood Circulators					
Town Center	Town Center Circulator	New	Add new downtown circulator linking major activity centers, cultural facilities, and points of interest within the Mesa Town Center.	n/a	10/15
Long	Longmore Circulator	New	Add new circulator in the vicinity of Main Street and Longmore near LRT terminus.	n/a	10/20

Source: S.R. Beard & Associates, 2002

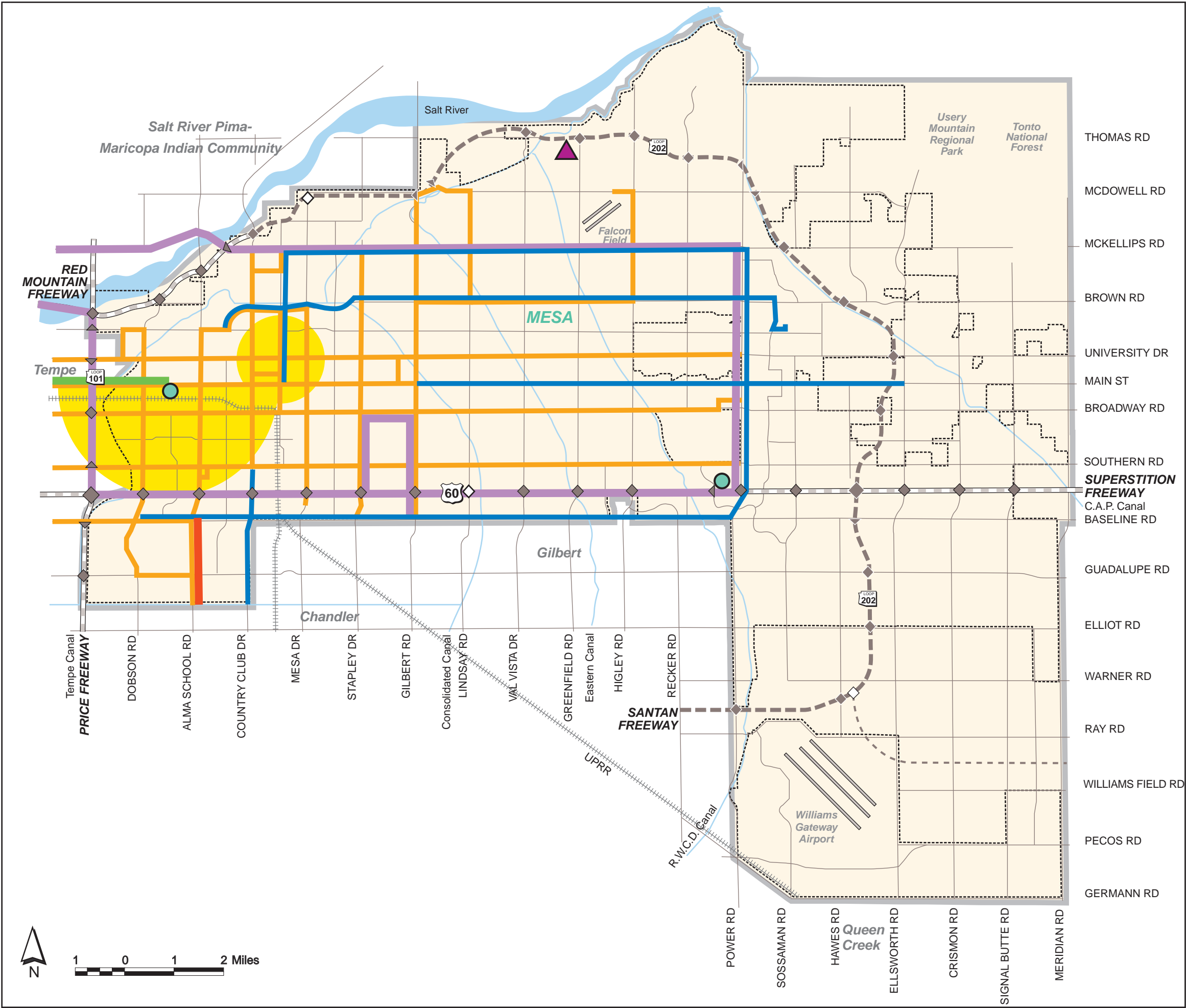
Transportation Plan



Short Term Transit Improvements (Years 1 to 5) Figure 5-4

- Existing Local Bus
- Existing Express Bus
- Modified Local Bus
- New Local Bus
- Light Rail Transit
- Circulator
- Park-and-Ride
- Maintenance Facility

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



in July 2002. A new route on Power Road would offer a more direct connection between Superstition Springs Mall, McKellips Road, and Mesa Community College at Red Mountain. Express bus routes in Mesa will remain unchanged in the short term.

Service frequencies will be improved to at least 30 minutes on all local bus routes Monday through Saturday with some routes operating at 15-minute frequencies in the weekday peak. Service hours will remain approximately 5 a.m. to 10 p.m. with no service on Sunday. No new express bus trips would be added in the short term.

Light Rail Transit

The 20.3 mile Central Phoenix/East Valley (CP/EV) LRT starter segment will begin operating in late 2006. The starter segment runs from 19th Avenue and Bethany Home Road to downtown Phoenix, through downtown Tempe, and into Mesa where it will terminate at Main Street and Longmore. The Red Line will be discontinued west of Longmore when LRT opens to eliminate duplication of service. LRT will operate at 10-minute headways in the peak and 20 minute headways in the off-peak.

Neighborhood Circulators

A downtown circulator has been identified as part of the Town Center Plan to link major activity centers, cultural facilities, and points of interest in downtown Mesa. It is recommended that this circulator be implemented in the short term, although specific routing is to be determined. The Town Center Circulator will operate all-day with 10-minute frequencies, Monday through Saturday. It is also recommended that a second neighborhood circulator be implemented in the vicinity of Main Street and Longmore. This intersection will be the terminus of the CP/EV LRT segment and will require transit connections to nearby fixed route bus service. A circulator in this area will operate with the same headway as LRT and provide access directly to Mesa Community College, Desert Samaritan Hospital, and Fiesta Mall.

Paratransit

Paratransit services are available in Mesa through the East Valley Dial-a-Ride, which is a partnership among the following six public agencies: City of Mesa, City of Chandler, City of Tempe, City of Scottsdale, Town of Gilbert, and the RPTA. The East Valley Dial-a-Ride allows for a single service area and provides services for ADA-certified passengers, seniors, and passengers with disabilities. Paratransit service will need to be expanded as new fixed route service is added in Mesa. ADA requires that complementary paratransit service be provided in all areas within three-fourths of a mile of fixed route bus service. The City should also continue its partnership with Mesa Senior Services in providing the Enabling Transportation Program.

Transit Facilities

Within the short term, transit facility improvements will focus on improving passenger amenities at existing and new bus stops. These improvements may include shelters, benches, trash receptacles, bicycle racks, and other amenities that will enhance the safety and comfort of the

City's transit patrons. The installation of these amenities should not preclude future treatments, such as electronic display boards and real-time passenger information.

Park-and-Ride Lots

Currently there are no publicly owned and operated park-and-rides within Mesa. Existing park-and-rides within the City are shared facilities with limited parking capacity. In the short term, it is proposed the City construct a regional park-and-ride facility to support regional bus service and carpooling in Mesa. The recommended site location is just north of US 60 between Power Road and Superstition Springs Boulevard (adjacent to Superstition Springs Mall). The park-and-ride is expected to accommodate anticipated growth in transit ridership in the US 60 corridor and serve as a central transfer point for express bus service between East Mesa and Phoenix/Tempe. The *Maricopa Association of Governments (MAG) Park-and-Ride Study* (January 2001) has recommended the proposed US 60/Power Road Park-and-Ride be given top priority for development and construction.

Maintenance Base

The short term plan also includes the new Mesa Transit Operations and Maintenance Facility at Greenfield Road and Virginia Street. The facility is scheduled to open in 2003 and will include an administration/operations building, maintenance building, CNG fueling building, bus wash building, fare retrieval building, and two bus canopies covering 18,400 square feet. The initial phase of construction will accommodate 100 buses, with ultimate build-out accommodating 200 buses. The initial phase is sufficient for the short-term plan.

Mid-Term Transit Improvements

The mid-term transit plan for years 6-15 is based on the future land use plan and other regional transportation and land use planning efforts.

Transit Service

The recommended mid-term transit service improvements are described in Table 5-9 and illustrated in Figure 5-5.

Local Bus Routes

In the mid-term, new routes will be added and existing routes modified to provide an increase in frequency. Service highlights include new north/south service on Val Vista and Greenfield between McKellips Road and Baseline Road. Sunday service will be introduced for the first time on all bus routes in Mesa. Service frequencies in the mid-term transit plan are summarized below:

- Service is provided 19 hours per day, Monday through Saturday.
- Service is provided 14 hours per day, Sundays and holidays.
- Buses operate at 15-minute headways in the peak and 30-minute headways in the off-peak, where appropriate.

Table 5-9
Mid-Term Transit Improvements

Route	Name	New, Modify Existing, Discontinue, or No Change	Route Description	Short Term Headway Peak/Off-Peak	Mid-Term Headway Peak/Off-Peak
Local Bus Routes					
R	Red Line	Modify Exist.	Discontinue west of Mesa Town Center. Extend east from Power Road to Meridian.	15/30	10/20
30	University	No Change	No Change	15/30	No Change
45	Broadway	No Change	No Change	15/30	No Change
61	Southern	No Change	No Change	15/30	No Change
77	Baseline	No Change	No Change	15/30	No Change
96	Dobson	No Change	No Change	15/30	No Change
104	Alma School	No Change	No Change	15/30	No Change
112	Country Club	No Change	No Change	15/30	No Change
120	Mesa Drive	Modify Exist.	Extend north to McKellips. Adjust routing and frequency to compliment LRT.	30	15/30
128	Stapley	Modify Exist.	Increase frequency	30	15/30
136	Gilbert Road	Modify Exist.	Adjust routing to serve future park-and-ride at Gilbert Road/McDowell Road near Loop 202.	30	15/30
McK	McKellips	Modify Exist.	Increase frequency	30	15/30
Brown	Brown	Modify Exist.	Increase frequency	30	15/30
Power	Power	Modify Exist.	Increase frequency. Extend service to Williams Gateway and Falcon Field.	30	15/30
Lind	Lindsay	New	Add new route on Lindsay Road between Gilbert/McDowell Park-and-Ride and Baseline Road.	n/a	15/30
Val	Val Vista	New	Add new route on Val Vista Drive between McKellips Road and Baseline Road.	n/a	15/30
Green	Greenfield	New	Add new route on Greenfield Road between McKellips Road and Baseline Road.	n/a	15/30
Express Bus Routes					
531	Mesa/Gilbert	Modify Exist.	Delete portion of route that operates north of US 60 when the new Gilbert Park-and-Ride is completed.	5 trips	12 trips
532	Mesa	Modify Exist.	Adjust route to serve future park-and-rides at Greenfield Road/Virginia Street and Gilbert Road/McDowell Road.	3 trips	12 trips
533	Mesa	Modify Exist.	Discontinue service on Power Road and start route at US 60/Power Road Park-and-Ride.	2 trips	12 trips
541	Chandler	Discontinue	Replaced by West Mesa express.	5 trips	n/a
West	West Mesa	New	Add new express bus route between Country Club Park-and-Ride and Phoenix/Tempe.	n/a	12 trips
Light Rail Transit					
LRT	Mesa Drive	New	LRT extension to Mesa Town Center.	10/20	No Change
Neighborhood Circulators					
Town Center	Town Center Circulator	Modify Exist.	Increase frequency	10/15	6/10
Long	Longmore Circulator	No Change	No Change	10/20	No Change
Wil	Wms Gateway	New	Add new circulator in vicinity of Williams Gateway.	N/A	10/15

Source: S.R. Beard & Associates, 2002

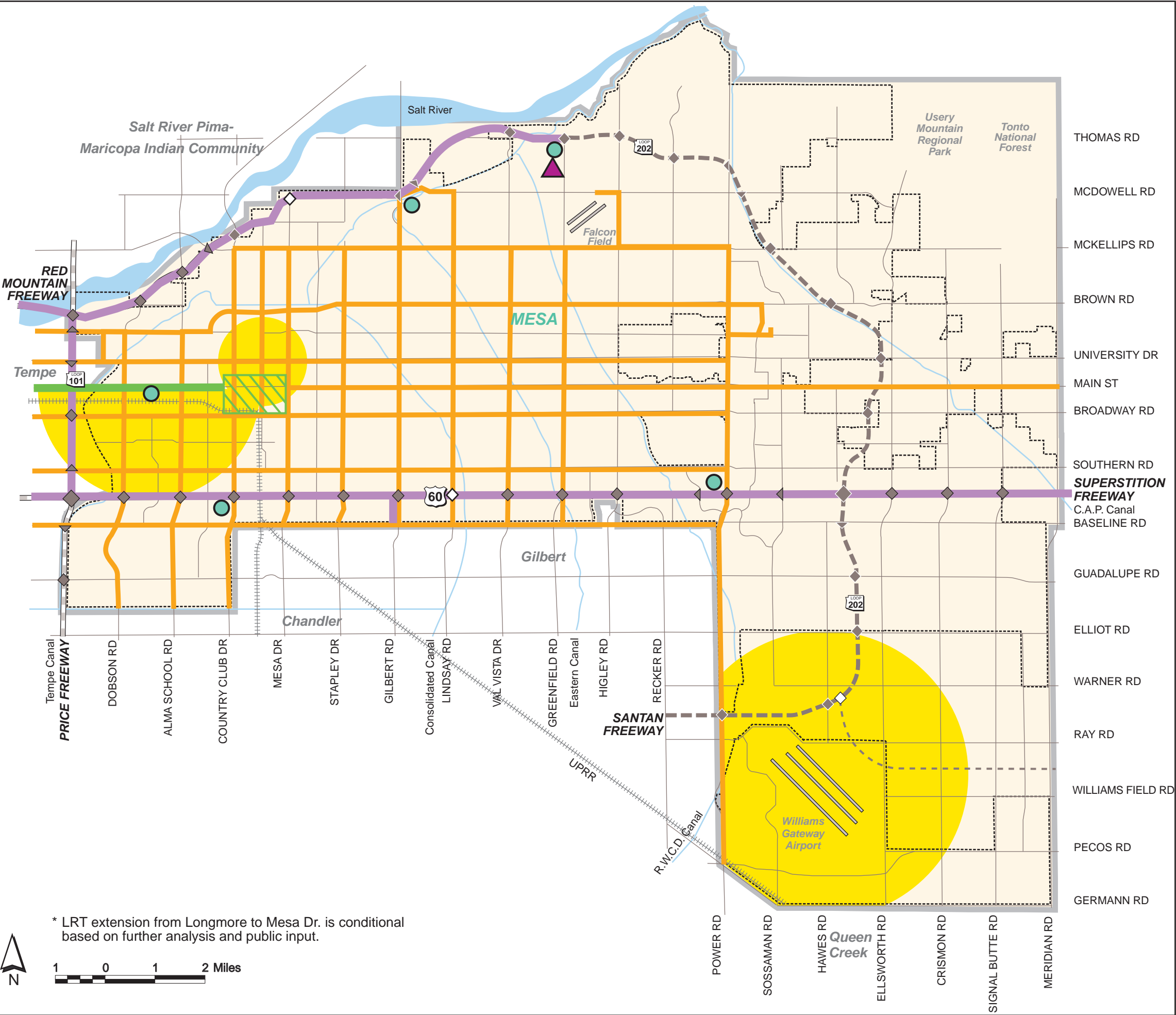
Transportation Plan



Mid-Term Transit Improvements (Years 6 to 15) Figure 5-5

- Local Bus
- Express Bus
- Light Rail Transit
- Town Center LRT Corridor*
- Circulator
- Park-and-Ride
- Maintenance Facility

- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



* LRT extension from Longmore to Mesa Dr. is conditional based on further analysis and public input.

Express Bus Routes

Express bus service in the mid-term will improve in both coverage and frequency. Service will be routed to originate at Mesa's new regional park-and-ride facilities and will primarily operate on US 60 and Loop 202. Existing express bus service on arterials will be replaced by frequent local transit service that connects with express bus service at activity centers and park-and-ride lots. Express buses will operate over a four-hour peak in both the morning and afternoon, with service concentrated in the middle two hours. Service during those two hours will be every 15 minutes while during the remainder of the peak service will be every 30 minutes.

Light Rail Transit

The CP/EV LRT starter segment will terminate at Main Street and Longmore in 2006. The mid-term transit plan recommends LRT be extended east from Longmore to Mesa Town Center. Any extension east of Longmore will not be part of the CP/EV minimum operable segment (MOS) and will require its own environmental documentation. The extension of LRT to Mesa Town Center will complete the rail link between



Phoenix/Tempe and downtown Mesa and will provide the opportunity for intermodal transfers between LRT and bus at a new downtown transit center. The Red Line will be discontinued west of Mesa Town Center when this extension is complete. In the mid-term, it is expected that LRT will operate with 10-minute headways in the peak and 20-minute headways in the off-peak.

Four LRT alignments are being considered for the Mesa Town Center between Country Club Drive and Mesa Town Center:

- Option 1: Main Street Double-Track
- Option 2: Main Street/1st Street Single-Track Loop
- Option 3: Main Street/1st Avenue Single-Track Loop
- Option 4: 1st Street/1st Avenue Single-Track Loop

It should be noted that the LRT extension between Country Club Drive and Mesa Drive is a conditional project pending further analysis and public input.

Capital Costs

LRT double-track operation on Main Street has the lowest capital cost among the four alignment options (see Table 5-10). There is a \$16 million cost difference between the Main Street alignment (Option 1) and the 1st Street/1st Avenue loop (Option 4).

Table 5-10
Town Center LRT Alignment Costs

Alignment Option	Estimated Capital Cost
Option 1: Main Street Double-Track	\$31.3 million
Option 2: Main Street/1 st Street Loop	\$38.1 million
Option 3: Main Street/1 st Avenue Loop	\$37.6 million
Option 4: 1 st Street/1 st Avenue Loop	\$48.2 million

Source: CP/EV LRT Project General Engineering Consultant, 2000

Operating Costs

Options 2, 3, and 4 would be 0.9 to 1.2 miles longer than Option 1 and add at least one additional station to the line. The loop alignment options would also pass through four to six additional signalized intersections. The increased travel times and longer distances for Options 2, 3, and 4 make the operating costs higher than Option 1.

Convenience of Service

The key issue for LRT in the Mesa Town Center is whether to have LRT serve existing activity centers north of Main Street or focus on future redevelopment (Mesa Arts Center and Aquatic Center) south of Main Street on 1st Avenue. Double-track LRT on Main Street is the only alignment option that would be convenient to both existing and future land uses within Mesa Town Center.

Transit Connectivity

Option 1 offers the most direct service into Mesa Town Center and has the best potential for inter-modal transfers between LRT and local bus. A downtown transit center has been proposed on Main Street west of Mesa Drive near the LRT terminus. The loop alignment options could be confusing to new riders and would require some out-of-direction travel for transfers.

Traffic

Options 1, 2, and 3 would reduce the number of lanes on Main Street from 4 lanes to 2 lanes, but would not impact the number of parking spaces. Auto access for future redevelopment projects (Mesa Arts Center and Aquatic Center) would be from 1st Avenue and north/south arterials. The reduction of one lane in each direction with LRT would result in lower auto speeds through downtown and would provide a more pedestrian friendly environment.

Construction Impacts

Construction impacts are expected to be a prime concern for merchants along Main Street. This area has experienced the effects of recent streetscape improvement construction. It is possible to preserve the existing streetscape and landscaped median along Main Street with Option 1. LRT would essentially operate in the existing inside lane in each direction on Main Street.

Future LRT Extensions

Option 1 would provide the most convenient starting point for an LRT extension to the east or south. Extension of the loop alignments (Options 2, 3, and 4) would be more difficult since they could require some out-of-direction travel.

Neighborhood Circulators

In the mid-term, service frequency for the Town Center Circulator will improve to 6 minutes in the peak and 10 minutes in the off-peak, seven days a week. Service frequencies for the Longmore Circulator will remain unchanged to coordinate with LRT service. In addition, a new circulator will be added in the vicinity of Williams Gateway. This service will connect Williams Gateway Airport, ASU East, and major employment/activity centers that will develop in Southeast Mesa.

Paratransit

The East Valley Dial-a-Ride will continue to expand in the mid-term as new fixed route service is added in Mesa. It currently provides services for ADA-certified passengers, seniors, and passengers with disabilities. ADA requires that complimentary paratransit service be provided in all areas within three-fourths of a mile of fixed route bus service. While service is currently offered to seniors, it is not required by ADA. In theory, higher levels of fixed route service will result in reduced dependency on paratransit services by seniors. The Enabling Transportation Program should be continued as a complementary service to both the fixed route and East Valley Dial-A-Ride services.

Transit Facilities

Mid-term transit facility improvements will continue to focus on improving passenger amenities (shelters, benches, etc.) in existing and new transit corridors. Over time, the use of electronic display boards and real-time passenger information should become standard. In addition, the mid-term transit plan identifies four new park-and-rides and a downtown transit center for implementation.

Park-and-Ride Lots

In the mid-term, the City will have in place a system of permanent, regional park-and-ride facilities that support regional bus service, LRT, and carpooling. The potential for a competitive, if not faster, travel time by transit to downtown Phoenix following the completion of Loop 202 and HOV lanes on US 60 is a factor for constructing permanent park-and-ride facilities in Mesa. The locations of the three new park-and-rides are listed in Table 5-11 and described below. These park-and-rides are in addition to the US60/Power Road park-and-ride that was recommended in the short term.

Table 5-11
Mid-Term Park-and-Rides

Facility	Location	Description
US 60/Country Club Park-and-Ride	US 60/Country Club Road	Park-and-ride at US 60 and Country Club Drive.
Loop 202/Gilbert Road Park-and-Ride	Gilbert Road/McDowell Road	Park-and-ride at Gilbert Road/McDowell Road next to Loop 202.
Loop 202/Greenfield Park-and-Ride	Greenfield Road/Virginia Street	A 226-space park-and-ride is proposed as part of the final build-out of the new Mesa Transit Operations and Maintenance Facility.

Source: S.R. Beard & Associates, 2002

Permanent, regional park-and-rides are proposed at US 60 and Country Club Drive and at Gilbert Road and McDowell road next to Loop 202. Both facilities are identified and prioritized in the *MAG Park-and-Ride Study* and will serve express bus routes operating between Mesa and Phoenix/Tempe. A 226-space park-and-ride is also proposed at the site of the new Mesa Transit Operations and Maintenance Facility. The park-and-ride is proposed as part of the final build-out of the site and will serve express bus routes operating between East Mesa and Phoenix/Tempe via Loop 202.

Downtown Transit Center

A new transit center is recommended in downtown Mesa to serve as a central transfer point for local bus service and an intermodal transfer point between bus and LRT. The site will be determined once the LRT alignment has been defined in the Town Center. An LRT station will be adjacent to the transit center to support the pedestrian oriented environment planned for downtown and to serve as gateways to the City's historic, civic, and commercial downtown core.

The downtown transit center will function as a hub for local and regional transit services and provide a safe and convenient place for transfers between local bus service, LRT, and paratransit. The transit center could also be designed to accommodate special event transit service and private shuttle services operated by employers.

Most bus routes serving the Mesa Town Center would be rerouted to serve the downtown transit center. Routes that are expected to serve the facility include:

- Red Line (Main Street)
- Route 30 (University Drive)
- Route 45 (Broadway Road)
- Route 120 (Mesa Drive)
- Mesa Town Center Circulator

The transit center should include the following features:

- Six (6) bus bays
- Bus turnaround area
- Drop off zone
- Passenger services building
- Shelters and seating
- Electronic display boards
- Real-time passenger information
- Neighborhood Police Substation
- Bicycle storage
- Landscaping and lighting
- Public art
- Opportunities for joint development

Other amenities may be included as determined by the City of Mesa.

Long-Term Transit Improvements

The long-term transit plan, for years 16 through 25, is based on the future land use plan and other regional transportation and land use planning efforts. Highlights of the 2025 land use plan are new activity centers in Southeast Mesa as well as the redevelopment of Main Street east of the downtown core.

Transit Service

The recommended long-term transit service improvements are illustrated in Figure 5-8 and described in Table 5-12.

Local Bus Routes

In the long term, new routes will be added to provide coverage on Mesa's one-mile arterial grid. Service highlights include new east/west service on most arterials between Power Road and Ellsworth Road. Southeast Mesa will be served for the first time with transit connections focused on Williams Gateway Airport and the surrounding activity centers. Service frequencies in the long term transit plan are summarized below:

- Service is provided 19 hours per day, Monday through Saturday.
- Service is provided 14 hours per day, Sundays and holidays.
- Buses operate at 15-minute headways in the peak and 30 minute headways in the off-peak.

Transportation Plan



Long-Term Transit Improvements (Years 16 to 25) Figure 5-6

- Local Bus
- Express Bus
- Light Rail Transit
- Town Center LRT Corridor*
- Transit Priority Corridor/BRT
- Circulator
- Future Regional Express Bus Service
- Future Commuter Rail
- Future Service Expansion (as demand warrants)
- Park-and-Ride
- Maintenance Facility
- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways

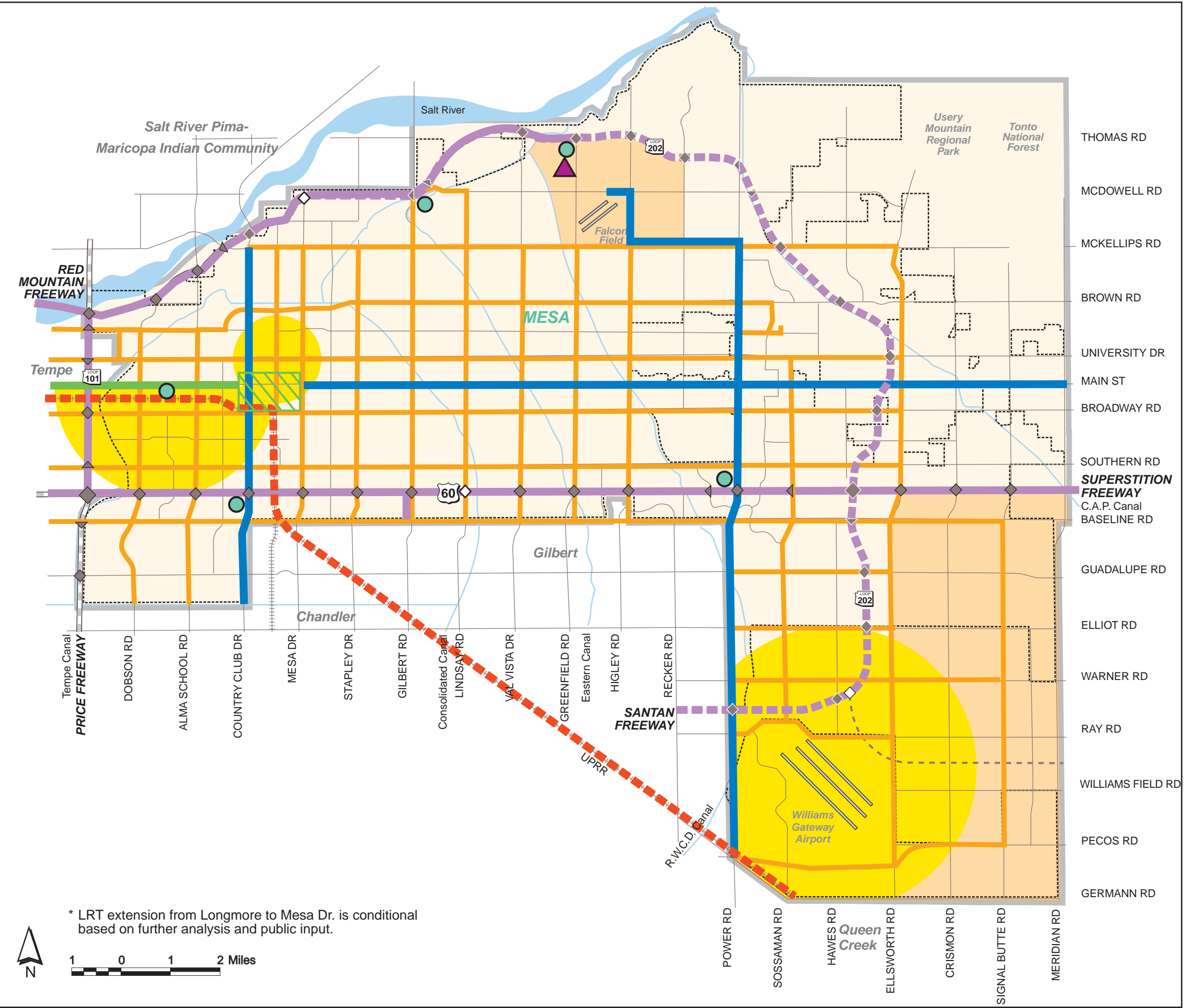


Table 5-12
Long Term Transit Improvements

Route	Name	New, Modify Existing, Discontinue, or No Change	Route Description	Mid Term Headway Peak/Off-Peak	Long Term Headway Peak/Off-Peak
Local Bus Routes					
R	Red Line	Modify Exist.	Implement TSM and other transit priority measures on Main with goal of operating BRT in the corridor.	10/20	No Change
30	University	Modify Exist.	Extend east from Power Road to Ellsworth Road.	15/30	No Change
45	Broadway	Modify Exist.	Extend east from Power Road to Ellsworth Road.	15/30	No Change
61	Southern	Modify Exist.	Extend east from Power Road to Ellsworth Road.	15/30	No Change
77	Baseline	Modify Exist.	Extend east from Power Road to Ellsworth Road.	15/30	No Change
96	Dobson	No Change	Extension south of Guadalupe Road would be funded by Chandler.	15/30	No Change
104	Alma School	No Change	No Change	15/30	No Change
112	Country Club	Modify Exist.	Implement TSM and other transit priority measures on Country Club with goal of operating BRT in corridor.	15/30	10/20
120	Mesa Drive	No Change	No Change	15/30	No Change
128	Stapley	No Change	No Change	15/30	No Change
136	Gilbert Road	No Change	No Change	15/30	No Change
McK	McKellips	Modify Exist.	Extend east from Power Road to Ellsworth Road.	15/30	No Change
Brown	Brown	No Change	No change	15/30	No Change
Power	Power	Modify Exist.	Increase frequency. Implement TSM and other transit priority measures on Power with goal of operating BRT in corridor.	15/30	10/20
Lind	Lindsay	No Change	No Change	15/30	No Change
Val	Val Vista	No Change	No Change	15/30	No Change
Green	Greenfield	No Change	No Change	15/30	No Change
Hig	Higley	New	Add new route on Higley Road between McKellips Road and Baseline Road.	n/a	15/30
Soss	Sossaman	New	Add new route on Sossaman Road between Mesa Multi-Generational Center and Williams Gateway.	n/a	15/30
Guad	Guadalupe	New	Add new route on Guadalupe Road east to Ellsworth Road.	n/a	15/30
Elliot	Elliot	New	Add new route on Elliot Road east to Ellsworth Road.	n/a	15/30
Warner	Warner	New	Add new route on Warner Road east to Ellsworth Road.	n/a	15/30
Ray	Ray	New	Add new route on Ray Road east to Ellsworth Road.	n/a	15/30
Pecos	Pecos	New	Add new route on Pecos Road east to Ellsworth Road.	n/a	15/30
Express Bus Routes					
531	Gilbert/Mesa	No Change	No Change	12 trips	No Change
532	North Mesa	No Change	No Change	12 trips	No Change
533	East Mesa	No Change	No Change	12 trips	No Change
Exp	West Mesa	No Change	No Change	12 trips	No Change
Exp	Southeast Mesa	New	Add new express bus route to Williams Gateway area.	n/a	6 trips

**Italicized rows indicate transit priority corridors with enhanced levels of service, TSM measures, and potential for BRT.*

Table 5-12
Long Term Transit Improvements (cont.)

Route	Name	New, Modify Existing, Discontinue, or No Change	Route Description	Mid Term Headway Peak/Off-Peak	Long Term Headway Peak/Off-Peak
Light Rail Transit					
LRT	CP/EV LRT	Modify Exist.	Increase frequency	10/20	6/12
Neighborhood Circulators					
Town Center	Town Center Circulator	No Change	No Change	6/10	No Change
Long	Longmore Circulator	Modify Exist.	Increase frequency	10/20	6/12
Wil	Williams Gateway	No Change	No Change	10/15	No Change

Source: S.R. Beard & Associates, 2002

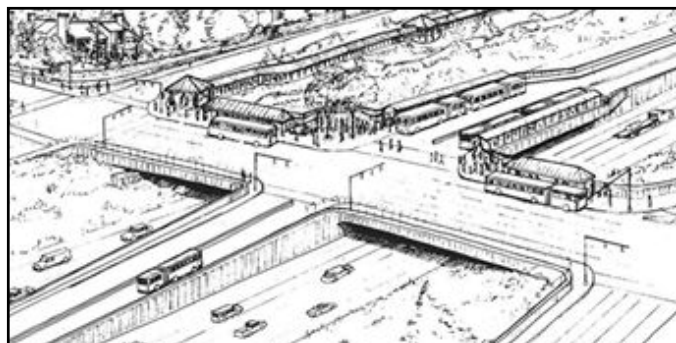
Express Bus Routes/Bus Rapid Transit

New express bus service to Southeast Mesa will be added in the long term to serve the Williams Gateway area. The specific routing of this service will be determined in conjunction with the development of Williams Gateway and the rest of Southeast Mesa. Express buses will continue to operate over a four-hour peak in both the morning and afternoon, with service concentrated in the middle two hours. Service during those two hours will be every 15 minutes while during the remainder of the peak service will be every 30 minutes.

In the event that in the long term there is a dedicated regional funding source for transit, Mesa should actively participate in discussions regarding all-day regional express bus service that would operate primarily on the regional freeway system. As demand warrants this regional express bus service could be converted to bus rapid transit (BRT), where buses use dedicated or shared bus lanes and serve in-line freeway or arterial stations. This form of high capacity transit service could be an effective way to serve Southeast Mesa if connections are made to major activity centers, such as Williams Gateway.

Transit Priority Corridors

As transit service and ridership grow in Mesa, so does the need for transit priority corridors where enhanced bus service can be provided. Three high travel demand corridors have been identified in the long term as having the potential for improved levels of service: Country Club Drive, Power Road, and Main Street (east of the LRT terminus).



The transit priority improvements in each corridor could range from intersection capacity improvements to BRT, where buses use dedicated or shared bus lanes that are assigned traffic signal priority. Each corridor could receive these treatments in phases, beginning with traffic signal priority in the short term and ending with the dedication of exclusive transit right-of-way in the long term.

Light Rail Transit

The long term transit plan recommends LRT service in Mesa increase frequency from 10 minutes in the peak and 20 minutes in the off-peak to 6 minutes in the peak and 12 minutes in the off-peak. It is undecided if or where light rail will be extended beyond Mesa Town Center. Conceptual alternatives include extending LRT east along a redeveloped Main Street or south to Chandler parallel to Mesa Drive. It is anticipated the decisions regarding LRT service beyond Mesa Town Center will be made in subsequent alternatives analysis studies.

Neighborhood Circulators

In the long term, the frequency of the Longmore circulator will be increased to 6 minutes in the peak and 12 minutes in the off-peak to match more frequent LRT service. No changes will be made to the Town Center and Williams Gateway circulators.

Paratransit

The East Valley Dial-a-Ride will continue to expand in the long term as new fixed route service is added in Mesa. ADA requires that complimentary paratransit service be provided in all areas within three-fourths of a mile of fixed route bus service. While service is currently offered to seniors, it is not required by ADA. In theory, higher levels of fixed route service will result in reduced dependency on paratransit services by seniors. The Enabling Transportation Program should be continued as a complementary service to both the fixed route and East Valley Dial-A-Ride services.

Commuter Rail

Commuter rail has been identified as a possible mode of high capacity transit between Mesa, Phoenix, and other regional destinations. One option for service is on an active Union Pacific Railroad line that currently runs through southern Mesa.

MAG is currently conducting the *High Capacity Transit Study* to determine the feasibility of commuter rail in Maricopa County. The study began in January 2002 and is scheduled to be completed at the end of 2002. The purpose of the study is to identify potential high capacity transit corridors in Maricopa County. The findings of the study will be included by MAG in establishing funding priorities for transit projects for the region, subject to the extension of the regional half-cent sales tax for transportation.

A potential connection between light rail and commuter rail could be provided for commuters if the Union Pacific Railroad line is utilized for commuter rail service.

Transit Facilities

Long term transit facility improvements will continue to focus on improving passenger amenities (shelters, benches, etc.) in existing and new transit corridors. As plans for a regional commuter rail and express bus system move forward, there will be the opportunity for the City of Mesa to construct additional passenger transfer facilities, such as inter-modal stations and park-and-rides.

Maintenance Base

The long term plan also includes expansion of the Mesa Transit Operations and Maintenance Facility. Increased bus service and frequency will require the maintenance base to be expanded to accommodate 200 buses from an existing capacity of 100 buses.

Cost Estimates

This section describes cost estimates for the proposed transit service and capital facility improvements in the short, mid, and long term planning horizons. Cost estimates are shown in constant 2002 dollars and do not include inflation. The total cost estimate for each planning horizon represents existing plus improved service levels and costs.

Operating Costs

The average cost for transit operations in the short term is projected to be approximately \$14.3 million on an annual basis (see Table 5-13). This figure represents the cost of existing transit service plus the short term transit improvements. Each of the improvements was described in detail earlier in this chapter. Assuming the short-term transit improvements are implemented over a five-year period, the total cost for the planning horizon is approximately \$71 million.

Table 5-13
Annual Operating Cost for the Short-Term (year 5)

Route	Name	Operating Cost
Local Bus Routes		
R	Red Line	\$950,130
30	University	\$1,126,080
45	Broadway	\$985,320
61	Southern	\$738,990
77	Baseline	\$304,290
96	Dobson	\$809,370
104	Alma School	\$527,850
112	Country Club	\$563,040
120	Mesa Drive	\$405,720
128	Stapley	\$318,780
136	Gilbert Road	\$927,360
McK	McKellips	\$666,540
Brown	Brown	\$579,600
Power	Power	\$260,820
Express Bus Routes		
531	Mesa/Gilbert	\$242,190
532	Mesa	\$161,460
533	Mesa	\$105,846
541	Chandler	\$224,250
Light Rail Transit		
LRT	CP/EV LRT	\$963,300
Neighborhood Circulators		
Town Center	Town Center Circulator	\$347,760
Long	Longmore Circulator	\$211,140
Paratransit		
	Enabling Transportation	\$195,000
	Dial-A-Ride	\$2,639,998
Total Average Annual Cost Estimate		\$14,254,834

Source: S.R. Beard & Associates, 2002

Transit operations are projected to cost approximately \$24.1 million on an annual basis in the mid-term (see Table 5-14). This figure represents the cost of the mid-term transit improvements but is inclusive of existing transit service and the short term transit improvements. Each of the improvements was described in detail earlier in this chapter. The total cost for the mid-term transit improvements is approximately \$120 million.

Table 5-14
Annual Operating Cost for the Mid-Term (year 15)

Route	Name	Operating Cost
Local Bus Routes		
R	Red Line	\$1,912,680
30	University	\$1,126,080
45	Broadway	\$985,320
61	Southern	\$738,990
77	Baseline	\$738,990
96	Dobson	\$809,370
104	Alma School	\$527,850
112	Country Club	\$563,040
120	Mesa Drive	\$637,560
128	Stapley	\$500,940
136	Gilbert Road	\$1,457,280
McK	McKellips	\$1,047,420
Brown	Brown	\$910,800
Power	Power	\$1,571,130
Lind	Lindsay	\$637,560
Val	Val Vista	\$455,400
Green	Greenfield	\$455,400
Express Bus Routes		
531	Mesa/Gilbert	\$486,533
532	Mesa	\$570,492
533	Mesa	\$581,256
541	Chandler	Discontinue
West	West Mesa	\$370,282
Light Rail Transit		
LRT	LRT extension to Mesa Town Center	\$2,539,235
Neighborhood Circulators		
Town Center	Town Center Circulator	\$521,640
Long	Longmore Circulator	\$273,240
Wil	Williams Gateway Circulator	\$678,960
Paratransit		
	Enabling Transportation	\$210,000
	Dial-A-Ride	\$2,779,996
Total Average Annual Cost Estimate		\$24,087,443

Source: S.R. Beard & Associates, 2002

Transit service in the long term is projected to cost approximately \$30.2 million on an annual basis (see Table 5-15). This figure represents the cost of the long term transit improvements

but is inclusive of existing transit service and the short and mid-term transit improvements. Each of the long term transit improvements was described in detail earlier in this chapter. The total cost for the planning horizon is approximately \$151 million.

Capital Costs

Capital cost estimates include vehicle fleet as well as capital facilities such as park-and-rides and transit centers. The cost estimates for capital facilities were developed using standard unit costs derived from similar fleet purchases and projects in the region.

Fleet estimates were derived using a formula developed by the Federal Transit Administration (FTA), which divides total annual service miles by 35,000 miles to reach the number of fleet required. Table 5-16 provides detail on the fleet required to operate the transit improvements in the short, mid, and long term. The City of Mesa currently owns 20 buses but for the purpose of this transit planning document it is assumed the number of existing fleet is zero. This assumption is made since the existing fleet will be midway through its existing life span when the short term transit improvements are implemented.

The number of fleet that needs to be purchased in the short, mid, and long term differs from the fleet required to operate the transit improvements in each horizon. The reason for this difference is that the life span of buses and LRT vehicles exceeds the length of the planning horizon. Assuming buses have an average life span of 12 years, those buses purchased in the short term do not need to be replaced until the long term planning horizon. LRT vehicles have an even longer life span (25 years) and do not need to be replaced over the duration of the transit improvement program. The fleet purchase needs for LRT result solely from the corresponding increase in service and frequency. Table 5-17 provides further detail on the fleet purchase needs for transit.

Table 5-15
Annual Operating Costs for the Long-Term (year 25)

Route	Name	Operating Cost
Local Bus Routes		
R	Red Line	\$1,912,680
30	University	\$1,730,520
45	Broadway	\$1,548,360
61	Southern	\$1,229,580
77	Baseline	\$1,229,580
96	Dobson	\$809,370
104	Alma School	\$527,850
112	Country Club	\$1,192,320
120	Mesa Drive	\$637,560
128	Stapley	\$500,940
136	Gilbert Road	\$1,457,280
McK	McKellips	\$1,320,660
Brown	Brown	\$910,800
Power	Power	\$1,571,130
Lind	Lindsay	\$637,560
Val	Val Vista	\$455,400
Green	Greenfield	\$455,400
Hig	Higley	\$455,400
Soss	Sossaman	\$819,720
Guad	Guadalupe	\$273,240
Elliot	Elliot	\$273,240
Warner	Warner	\$273,240
Ray	Ray	\$273,240
Pecos	Pecos	\$273,240
Express Bus Routes		
531	Mesa/Gilbert	\$486,533
532	Mesa	\$570,492
533	Mesa	\$581,256
West	West Mesa	\$370,282
SE	Southeast Mesa	Cost Unknown
Light Rail Transit		
LRT	CP/EV LRT	\$2,539,235
Neighborhood Circulators		
Town Center	Town Center Circulator	\$521,640
Long	Longmore Circulator	\$455,400
Wil	Williams Gateway	\$678,960
Paratransit		
	Enabling Transportation	\$345,000
	Dial-A-Ride	\$2,919,994
Total Average Annual Cost Estimate		\$30,237,101

Source: S.R. Beard & Associates, 2002

Table 5-16
Required Fleet for the Short, Mid, and Long Term

		Short Term		Mid-Term		Long Term	
Route	Name	Annual Revenue Miles	Vehicles Required	Annual Revenue Miles	Vehicles Required	Annual Revenue Miles	Vehicles Required
Local Bus Routes							
R	Red Line	275,400	8	554,400	16	554,400	16
30	University	326,400	9	326,400	9	501,600	14
45	Broadway	285,600	8	285,600	8	448,800	13
61	Southern	214,200	6	214,200	6	356,400	10
77	Baseline	88,200	3	214,200	6	356,400	10
96	Dobson	234,600	7	234,600	7	234,600	7
104	Alma School	153,000	4	153,000	4	153,000	4
112	Country Club	163,200	5	163,200	5	345,600	10
120	Mesa Drive	117,600	3	184,800	5	184,800	5
128	Stapley	92,400	3	145,200	4	145,200	4
136	Gilbert Road	268,800	8	422,400	12	422,400	12
McK	McKellips	193,200	6	303,600	9	382,800	11
Brown	Brown	168,000	5	264,000	8	264,000	8
Power	Power	75,600	2	455,400	13	455,400	13
Lind	Lindsay			184,800	5	184,800	5
Val	Val Vista			132,000	4	132,000	4
Green	Greenfield			132,000	4	132,000	4
Hig	Higley					132,000	4
Soss	Sossaman					237,600	7
Guad	Guadalupe					79,200	2
Elliot	Elliot					79,200	2
Warner	Warner					79,200	2
Ray	Ray					79,200	2
Pecos	Pecos					79,200	2
Total			76		125		172
Express Bus Routes							
531	Mesa/Gilbert	70,200	2	141,024	4	141,024	4
532	Mesa	46,800	1	165,360	5	165,360	5
533	Mesa	30,680	1	168,480	5	168,480	5
541	Chandler	65,000	2		0		0
West	West Mesa		0	107,328	3	107,328	3
Total			6		17		17
Light Rail Transit							
LRT	CP/EV LRT				5		7
Total					5		7
Neighborhood Circulators							
Town	Town Center Circ.	100,800	3	151,200	4	151,200	4
Long	Longmore Circ.	61,200	2	79,200	2	132,000	4
Wil	Williams Gateway					196,800	6
Total			5		7		14

Source: S.R. Beard & Associates, 2002

Table 5-17
Required Fleet Purchases for the Short, Mid, and Long Term

Route	Name	Short Term	Mid-Term	Long Term	Total
Local Bus Routes					
R	Red Line	8	8	8	24
30	University	9	0	14	24
45	Broadway	8	0	13	21
61	Southern	6	0	10	16
77	Baseline	3	4	7	13
96	Dobson	7	0	7	13
104	Alma School	4	0	4	9
112	Country Club	5	0	10	15
120	Mesa Drive	3	2	3	9
128	Stapley	3	2	3	7
136	Gilbert Road	8	4	8	20
McK	McKellips	6	3	8	16
Brown	Brown	5	3	5	12
Power	Power	2	11	2	15
Lind	Lindsay		5	0	5
Val	Val Vista		4	0	4
Green	Greenfield		4	0	4
Hig	Higley			4	4
Soss	Sossaman			7	7
Guad	Guadalupe			2	2
Elliot	Elliot			2	2
Warner	Warner			2	2
Ray	Ray			2	2
Pecos	Pecos			2	2
<i>Total</i>		76	49	123	248
Express Bus Routes					
531	Mesa/Gilbert	2	2	2	6
532	Mesa	1	3	1	6
533	Mesa	1	4	1	6
541	Chandler	2	-2	2	2
West	West Mesa	0	3	0	3
<i>Total</i>		6	11	6	23
Light Rail Transit					
LRT	CP/EV LRT		5	7	12
<i>Total</i>			5	7	12
Neighborhood Circulators					
Town	Town Center Circ.	3	1	3	7
Long	Longmore Circ.	2	1	3	6
Wil	Williams Gateway	0	0	6	6
<i>Total</i>		5	2	12	18

Source: S.R. Beard & Associates, 2002

The total capital cost estimates for the short, mid, and long term transit improvements include fleet requirements and planned capital facilities (see Table 5-18). The standard unit costs are derived from similar fleet purchases and capital projects in the region. The unit cost for park-and-rides and transit centers represents the total cost of the facility. Mesa's share may be less depending on the funding sources used.

The average annual capital cost estimate for the short term is determined by dividing the total capital cost for each horizon by five. The average annual capital cost estimate for the mid and long term is determined by dividing the total capital cost for each horizon by ten. This results in the following average annual capital cost estimates: \$15.6 million for the short term, \$15.6 million for the mid-term, and \$7.9 million for the long term.

Table 5-18
Capital Costs for the Short, Mid, and Long Term

Capital Improvement	Unit Cost	Short Term		Mid-Term		Long Term	
		Quantity	Cost	Quantity	Cost	Quantity	Cost
Fleet							
Buses (30 ft)	\$300,000	5	\$1,500,000	2	\$600,000	12	\$3,600,000
Local Bus (40 ft)	\$320,000	76	\$24,320,000	49	\$15,680,000	123	\$39,360,000
Express Bus (45 ft)	\$400,000	6	\$2,400,000	11	\$4,400,000	6	\$2,400,000
LRT vehicle ¹	\$3,500,000			5		7	\$24,500,000
Dial-A-Ride	tbd		\$50,000		\$50,000		\$50,000
<i>Total Fleet Cost</i>			\$28,270,000		\$20,730,000		\$69,910,000
Facilities							
Park-and-Rides ²	\$4,000,000	1	4,000,000	3	\$12,000,000		
Transit Center	\$5,000,000			1	\$5,000,000		
Maintenance Facility Expansion	\$8,000,000					1	\$8,000,000
LRT	\$47,000,000	n/a	\$61,325,000 ³	2.5	\$113,975,000		
Shelters	\$30,000	30	\$900,000	30	\$900,000	30	\$900,000
Enhancements			\$3,000,000		\$6,000,000		\$6,000,000
<i>Total Facility Cost</i>			\$65,225,000		\$141,875,000		\$14,900,000
Total			\$97,495,000		\$158,605,000		\$84,810,000

Source: S.R. Beard & Associates, 2002. ¹LRT vehicle cost is included in the LRT capital facility cost when shown.

²Mesa's share may be less than the total cost of the facility. ³Cost reflects Mesa share of CP/EV LRT Project.

Total Cost Estimates (Operating and Capital)

The total average annual cost estimates for transit service and capital are included in Table 5-19. This summary represents the total cost to implement transit improvements in the short, mid, and long term. The total average cost estimate for transit improvements in the short term is approximately \$46.4 million, while in the mid-term it is \$39.6 million and in the long term it is \$37.7 million.

Table 5-19
Total Costs (Operating and Capital)

Transit Improvement	Short Term Average Annual Cost Estimate	Mid-Term Average Annual Cost Estimate	Long Term Average Annual Cost Estimate
Operations	\$11,953,000	\$19,662,700	\$27,469,500
Capital	\$19,499,000	\$15,860,500	\$8,481,000
Total	\$31,452,000	\$35,523,200	\$35,950,500

Source: S.R. Beard & Associates, 2002

6.0 BICYCLE PLAN



The Bicycle Plan is a modal element of the Mesa Transportation Plan. It establishes a coordinated strategy to encourage and develop bicycling as an integral part of the City's multi-modal transportation system. The Bicycle Plan provides guidance in five key areas:

- Supports implementation of the Transportation Element of the General Plan
- Identifies a preferred future network of bikeways
- Identifies vital end-of-trip facilities
- Integrates the bicycle network with transit service
- Promotes cycling through education, enforcement, and encouragement

The Importance of Bicycling

Bicycling is an important mode of travel for people in Mesa. It has a role in reducing congestion, improving air quality, providing travel choices, and providing greater mobility for those without access to a vehicle (children, elderly, and those who can't afford a private auto). Bicycling is also a choice for those with access to a car, because it is a healthy, relaxing activity to share with family and friends that can improve personal health through regular exercise.

The bicycle is a means of transportation that is quiet, non-polluting, extremely energy-efficient, and versatile. Bikeways offer an efficient use of public dollars and increase the carrying capacity of the overall transportation system.

Background

Bikeway facilities are described in three general categories: 1) bicycle lanes, 2) bicycle routes, and 3) shared use paths. A bicycle lane is a designated portion of the roadway, which is marked for bicycle use. Bicycle routes are designated with signs, and establish continuous routing for bicycle traffic. The third category, shared use path, is an exclusive facility for non-motorized travel (e.g., bicyclists, walkers, joggers, in-line skater, etc.) in its own corridor separated from vehicular traffic.

The City of Mesa prepared a bicycle plan in 1997. The plan discussed issues and needs, goals and objectives, and opportunities and constraints. The plan included an inventory of existing conditions by facility type (bicycle routes, bicycle lanes, and shared use paths) and recommendations for additional links. At the time the plan was prepared, the city had 62.4 miles of bicycle routes and 10.2 miles of bicycle lanes. The City of Mesa prepared and published its first bicycle map in August 1997. In addition to the City of Mesa Bicycle Plan, there are several other bicycle plans from the Maricopa Association of Governments (MAG) and neighboring communities that affect the City of Mesa, including the following:

- The Maricopa County Bicycle Transportation System Plan (1999)
- The MAG Regional Bicycle Plan (1999)
- The City of Chandler Bike Plan Update (1999)
- The Town of Gilbert Parks, Open Space and Trails Plan (1996)
- Southeast Valley Transportation Study (2000)
- MAG Regional Off-Street System Plan (2001)

The Cyclist

People ride bicycles for a variety of reasons, including personal health, concern for the environment, and relative cost to operating an automobile. People of all ages are bicycle riders, and come with a wide range of skill levels, riding speeds, and expectations. For example, the skilled rider may feel comfortable mixing with auto traffic on heavily traveled arterials, while the less experienced rider often feels more comfortable on paths separated from auto traffic, or along quiet residential streets. As such, it's important that the bicycle network provide a wide range of facilities to meet the needs and expectations of the community.

Trip Types

Bicycle travel falls into three general categories: 1) commuter travel; 2) utilitarian travel; and 3) recreational travel. The needs and destinations for each trip are different, and should be

considered when envisioning a citywide bicycle system. While many cyclists will travel greater distances, the typical range for facilities planning is 3.0 miles. In all cases, bicycling trips require a well-integrated system of bikeway facilities (e.g., bicycle lanes) and convenient, accessible end of trip facilities (e.g., bicycle parking).

Commuter

People who use bicycles as their choice for commuting to and from work generally prefer to travel on arterial streets to reach major destinations (a continuous network of shared-use paths along canals can also be effective for bicycle commuters). At the work end of their trip, commuters require secure, long-term parking or storage facilities. Other desirable facilities and services include showers, changing facilities, and convenient connections to transit.

Utilitarian

Utilitarian trips such as shopping or personal business are frequently made on arterial or collector streets. Direct, convenient connections are extremely important to the utilitarian cyclist. Cyclists making utilitarian trips require secure, short-term parking (usually convenient bicycle racks will suffice).

Recreation

Many recreational riders prefer to travel on bicycle paths or bicycle lanes on collector streets. Direct, quick routes are usually of less importance than other considerations (e.g., amenities, scenery, or physical exercise). Recreational cyclists are often destined to parks and other recreational areas, or may not have a specific destination in mind. Parking requirements are usually short-term, and are best served with bicycle racks.

Current Conditions

The City of Mesa has been very successful in recent years in enhancing and expanding the bikeway system. Each year, new bicycle lanes are being striped on arterial streets, and additions being made to shared-use paths along the canal system. In addition, most arterial street improvements now include bicycle lanes.

The location of existing bicycle routes, bicycle lanes, and bicycle paths in the planning area are shown in Figure 6-1. These include 70 miles of bicycle routes, 40 miles of bicycle lanes, and 1 mile of paved bicycle path with another 1.25 miles under construction (scheduled for completion

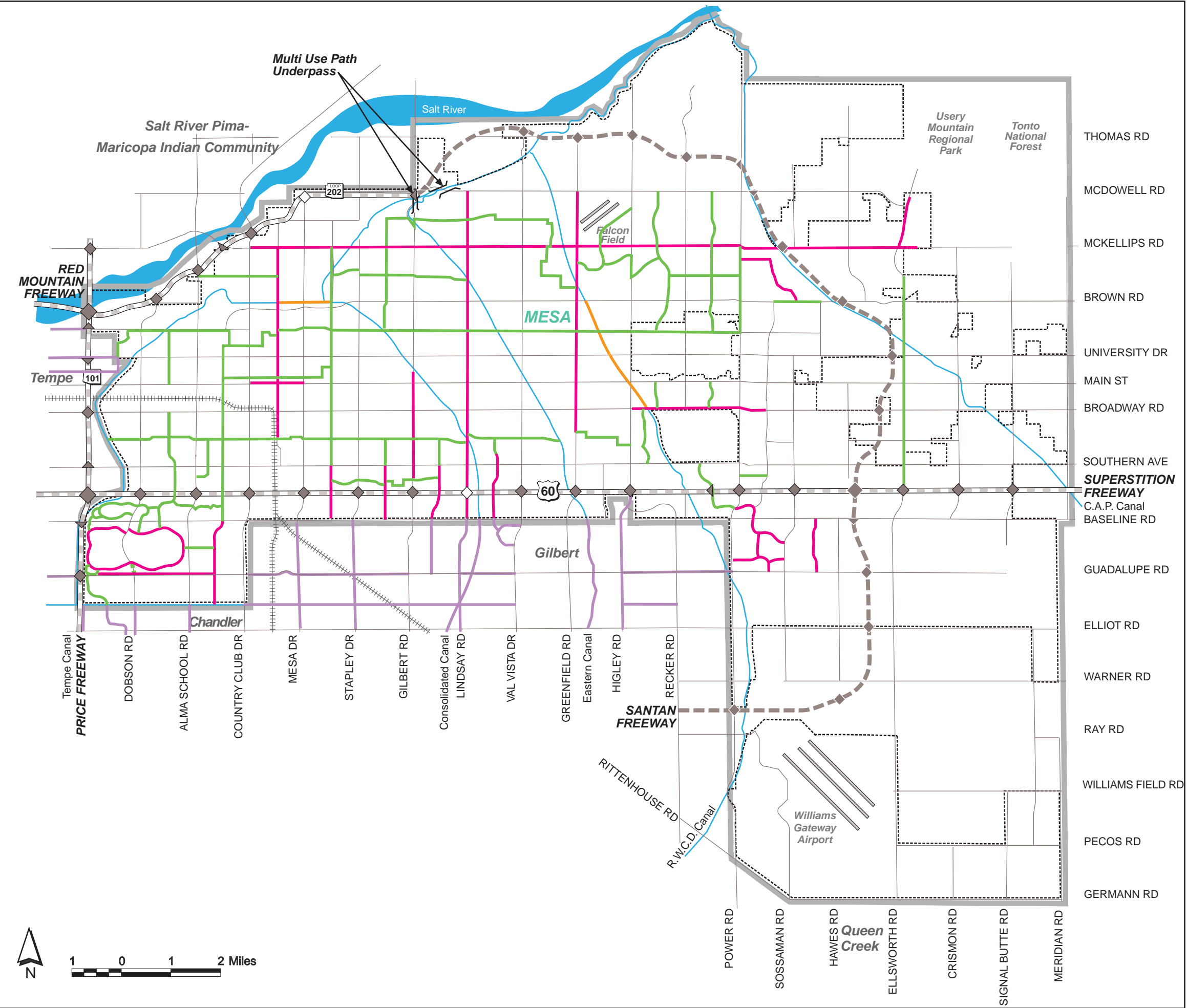
Transportation Plan



Existing Bicycle Facilities

Figure 6-1

- Existing Bike Route
- Existing Bike Lane
- Existing Shared Use Path
- Other Jurisdiction's Routes
- Planning Area Boundary
- City Limit
- Existing Freeway
- Interchange
- Future Interchange
- Proposed Freeway
- Major Arterial Roadway
- Canals and Waterways



in Spring 2002). Mileage is calculated in linear miles; a linear mile of a bicycle route includes two miles of travel-way, one mile in each direction.

Future Bicycle System

As set forth by the Arizona Revised Statutes, a bicyclist in Arizona has the same rights and responsibilities as motorists when using public roadways. It is therefore necessary to design streets to allow cyclists to ride in a manner consistent with the vehicle code. Existing and future needs were evaluated to define a future bicycle system for the City of Mesa. The future system includes bicycle routes, bicycle lanes, and shared use paths, as well as recommendations for vital end-of-trip facilities. The following is a summary of five criteria that were considered in recommending future bicycle facilities; safety, access, physical barriers, continuity, and integration with transit.

Safety

The safety of cyclists is improved through facilities design, operations, and maintenance; public education programs; and improved security at destinations. The City of Mesa currently maintains bicycle facilities in good working order (e.g., regular street sweeping to remove broken glass and debris), and is systematically improving how the system operates for cyclists. For example, bicycle loop detectors are routinely placed in bike lanes at intersections with right turn lanes for autos, and push buttons are used throughout the City. Additionally, public outreach is aimed at improving how cyclists and motorists interact in a busy urban environment.

Access

It is important to provide connections for cyclists to their destinations – places of employment, shopping centers, schools, and recreational areas. Bicycle access should be provided between and through development sites (particularly in high demand areas like schools and parks).

Physical Barriers

A number of physical barriers exist that can greatly reduce the use of an otherwise inviting bicycle facility. Barriers that may be encountered in the City of Mesa include canals, railroads, narrow bridges, tight intersections, drainage structures, fences, and freeways. Several projects in the plan help reduce the impacts of barriers through alternate routing, improvements to existing/planned structures, and new bike structures.

Continuity

It is important to provide a bicycle system that offers a continuous, integrated network of routes, lanes, and shared-use paths. Small breaks in a bikeway tend to reduce overall use of the



Continuity through intersections provides convenience for cyclists.

facility. Providing well-delineated space for cyclists approaching intersections helps improve continuity of the overall bicycle network.

In general, it is desirable to develop a continuous network of bicycle facilities spaced at no more than one mile apart. Facilities were included in the future bicycle system that close gaps in the existing network, and that provide connections with neighboring jurisdictions. Special consideration should be given to ensure that connections are provided along the half-mile collector streets across the new freeway system in Mesa. In addition, it is desirable to develop a

network of interconnected local streets to improve bicycle circulation in and through residential neighborhoods. Bicycle routes were identified to improve mobility through areas where cyclists must travel more than one mile to access a designated facility.

Integration With Transit

Providing convenient access between bicycle facilities and transit routes (bus and light rail transit) can greatly increase the commuting distance available to cyclists. Alternatively, by providing bicycle/transit connections, a cyclist may choose to bike in the morning, and ride the bus home at night (an effective strategy in the summer for Mesa's hot desert climate).

Bicycle facilities included in this plan were coordinated with development of the Public Transportation Plan. Additionally, the design of future transit facilities, including transit centers and light rail stations, should consider the needs of cyclists (e.g., short- and long-term parking).

The proposed new facilities in the City of Mesa planning area are shown in Figure 6-2 and listed by facility type in the following sections.

On-Road Bikeways

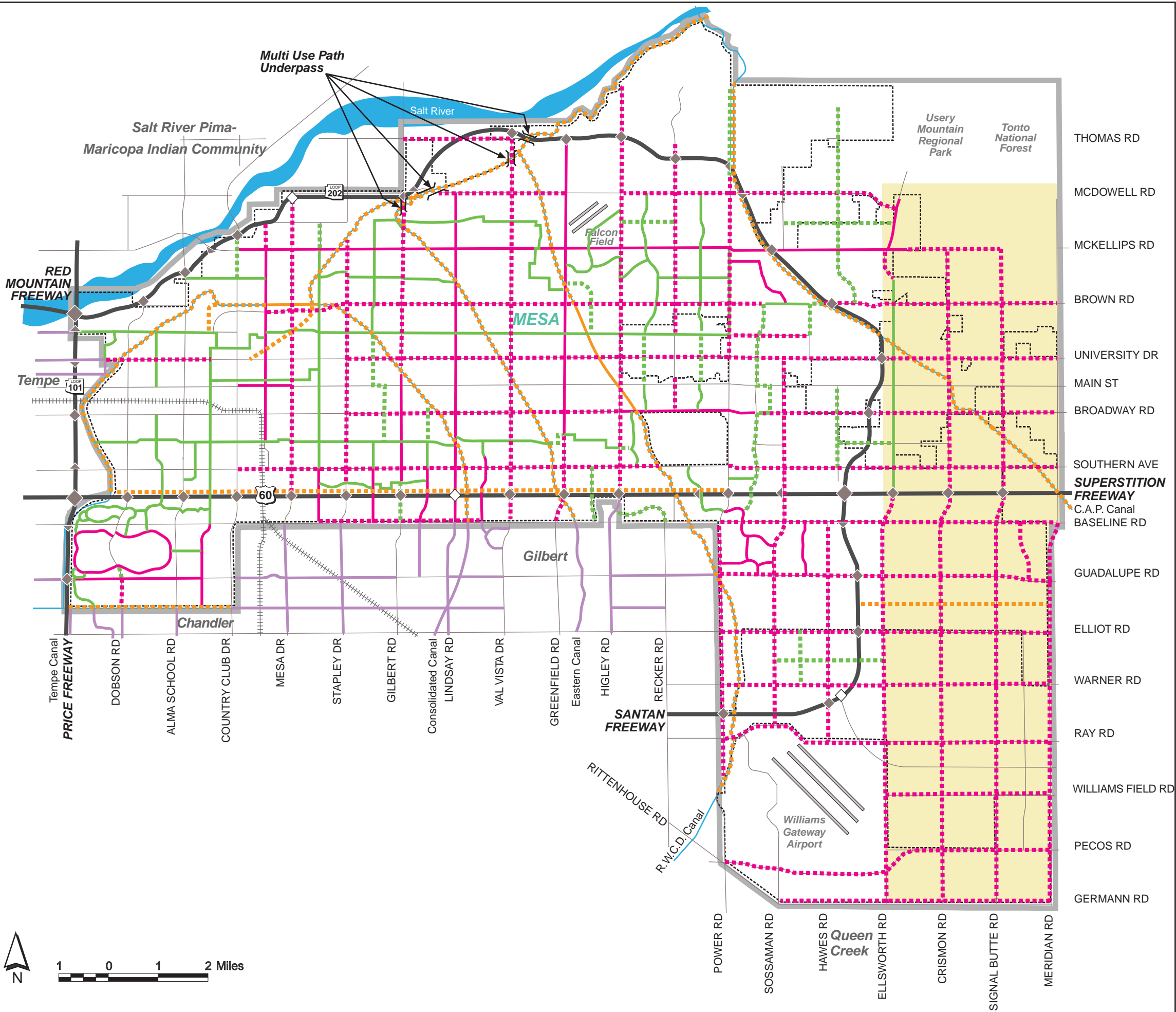
Bicycles are allowed on all roadways within the City of Mesa with the exception of the freeways. On-road bikeways are created when a street includes appropriate design treatments to accommodate bicyclists. The basic treatments used in Mesa to accommodate bicyclists on roadways include shared roadways, bicycle routes, and bicycle lanes (graphics are from the Oregon Bicycle and Pedestrian Plan, Oregon Department of Transportation, 1995).

Transportation Plan



Future Bicycle Facilities

Figure 6-2



- Developing Areas*
- Proposed Bike Route
- Proposed Bike Lane
- Proposed Shared Use Path
- Existing Bike Route
- Existing Bike Lane
- Existing Shared Use Path
- Other Jurisdiction's Routes
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways

*NOTE: Additional bicycle facilities will be added in developing areas to provide an inter-connected system.

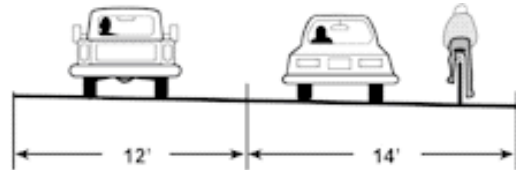


Shared Roadways

Bicyclists share the same travel lanes with motorists on shared roadways. Shared roadways are common on residential streets and along mid-section collectors. This type of configuration can be improved for cyclists by providing a wide outside travel lane, which typically allows an average size automobile to pass a cyclist without crossing into the adjacent lane.



Bicycle travel on a shared roadway.



A wide outside lane provides additional comfort for cyclists.

Bicycle Routes

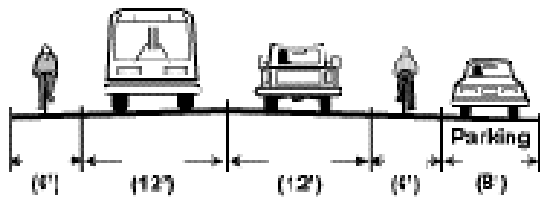
Bicycle routes typically are placed on arterial streets and lower volume half-mile streets that connect cyclists through neighborhoods. Bicycle routes are used in the City of Mesa to delineate preferred, direct routes for cyclists to use. Routes are signed to help direct cyclists and to warn motorists of the presence of cyclists, and may include an edge of pavement line for separation from vehicular traffic, although the area is not designated as a bicycle lane.



Bicycle routes include special signage.

Bicycle Lanes

A bicycle lane is a portion of a roadway designated for the preferential use of bicyclists. Bicycle lanes provide one-way travel in the same direction as vehicular traffic, and should always be provided on both sides of a two-way street. Bicycle lanes in the City of Mesa are of two types: either as a painted shoulder, or a lane shared with automobile parking. Bicycle lanes are 4 to 6.5 feet in width or 12 feet in width if shared with parked cars.



Typical bicycle lane

Bicycle lanes will be added to existing arterials with sufficient width and as streets are resurfaced. Bicycle lanes will also be added as part of overall street widening projects, and as arterials are constructed in developing areas. In particular, bicycle lanes should be added in the developing areas of Mesa (primarily in Northeast Mesa and Southeast Mesa) along an interconnected network of new half-mile collector streets.

**Table 6-1
Proposed Bicycle Routes**

Road	Limits	Length (miles)
Dobson Road	Guadalupe - Keating	0.25
Country Club Drive	North City Limit - McLellan	1.5
Harris	8 th St - 8 th Ave	2.0
Gilbert Road	Hampton - Baseline	0.75
24 th Street	Pueblo - Consolidated Canal	1.0
48 th Street	Greenfield - Adobe	1.0
48 th Street	Southern - Baseline	1
56 th Street	Main - Adobe	1.0
63 rd Street	Main - Adobe	1.0
Power Road	North City Limit - Loop 202	1.5
72 nd Street	Superstition Springs - Brown	3.5
80 th Street	Brown - Adobe	0.5
80 th Street	Elliot - Warner	1
Hawes Road	Main - Southern	1.5
Hawes Road	Thomas - Brown	3.5
Hermosa Vista Drive	Higley - Recker	1
Hermosa Vista Drive	Sossaman - Ellsworth	2
Pueblo Ave	Hawes - Ellsworth	1
Mesquite Street	Sossaman - Ellsworth	2

**Table 6-2
Proposed Bicycle Lanes**

Roadway	Limits	Length (miles)
Dobson Road	Western Canal – Guadalupe	0.5
Mesa Drive	McDowell – US 60	5.5
Stapley Drive	McKellips – Harmony	4.25
Gilbert Road	North City Limit – Consolidated Canal	3.25
Val Vista Drive	North City Limit – Baseline Road	7.0
Greenfield Road	Pueblo- Baseline	1.5
Higley Road	North City Limit – US 60	7.0
Recker Road	Thomas - Adobe	3.5
Power Road	Loop 202 – University	3.5
Power Road	Baseline – Williams Field	5.0
Sossaman Road	University - Ray	6.75
Hawes Road	Baseline - Ray	4.0
Ellsworth Road	US 60 – Germann	7.5
Ellsworth Road	McKellips - McLellan	0.5
Crismon Road	Germann – McKellips	12.0
Signal Butte Road	Germann – McKellips	12.0
Meridian Road	Baseline - Germann	7.0
Thomas Road	Gilbert – Val Vista	2.0
McDowell Road	Higley –Ellsworth	5.0
McDowell Road	Gilbert – Greenfield	3.0
McKellips Road	Ellsworth – Signal Butte	2.0
Brown Road	Center – Sun Valley	9.0
Brown Road	CAP - Meridian	4.0
University Drive	West City Limit – Extension	1.75
University Drive	Stapley – Meridian	13.0
Broadway Road	Stapley – Higley	5.0
Broadway Road	Sun Valley – Meridian	6.0
Southern Avenue	Country Club – RWCD Canal	7.75
Southern Avenue	Power – Meridian	6.0
Baseline Road	Harris – Consolidated Canal	1.75
Baseline Road	Power – Meridian	6.0
Elliot Road	Power – Meridian	6.0
Warner Road	Power - Meridian	6.0
Ray Road	Power - Meridian	6.0
Williams Field Road	Ellsworth - Meridian	3.0
Pecos Road	Power – Meridian	6.0
Germann Road	Sossaman - Meridian	5.0

Shared-Use Paths

Shared-use paths typically are located along open space corridors such as canal banks, freeways, and utility corridors. Shared-use paths are usually used by all types of non-motorized forms of transportation including cyclists, pedestrians, joggers, in-line skaters, etc. Existing shared-use paths are along the Crosscut Canal (1 mile paved and 1 mile unpaved) and the RWCD Canal (2 miles unpaved).

With the provision of the shared-use paths, connections need to be made to route bicyclists to their destinations. Additionally, signage systems are needed to uniquely identify each trail segment with a number and/or a name. The identification system would be most useful to cyclists and hikers to locate their position and orientation to the trail network. Special attention should be focused on the trail/road crossings to ensure safety for mixed-mode crossings, particularly at mid-block crossings. Special provisions for public art should also be considered along canal paths.



Entrance to a shared-use path along a canal

Future shared-use paths were developed in concert with the City's Parks and Recreation Master Plan, and are listed below.

Proposed Shared-Use Paths

Western Canal	3.0 miles
Tempe Canal	5.25 miles
Eureka Canal	0.5 miles
Crosscut Canal	1.75 miles
Mesa Canal.....	1.5 miles
Consolidated Canal	8.0 miles
Eastern Canal	6.5 miles
South Canal	4.0 miles
RWCD Canal	10.0 miles
CAP Canal	9.0 miles
US 60: Loop 101 to Power Road	12.0 miles
Power Line Easement.....	3.5 miles

End Of Trip Facilities

In addition to the bicycle lanes, routes, and paths provided for travel, other facilities and amenities help make bicycling a desirable choice for travel (e.g., destination signage, bicycle racks on buses, bicycle parking, showers and changing facilities, and storage lockers).

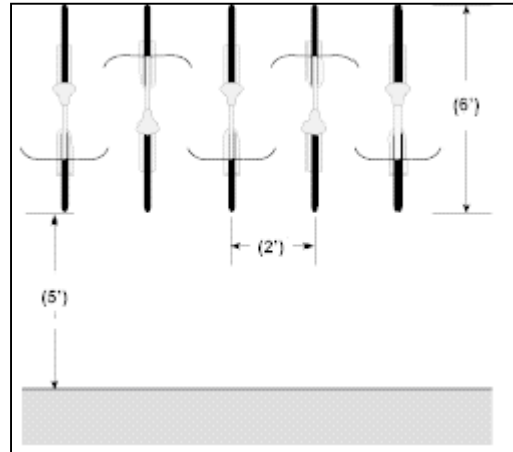
Bicycle Parking

The City of Mesa currently does not require private developments to include bicycle parking, putting cycling at a distinct disadvantage to auto drivers. The City should consider developing

specific requirements for the provision of appropriate bicycle parking and shower facilities. Appropriately designed bicycle parking makes access to commercial centers convenient and secure for cyclists. In relation to the space required for vehicular parking, bicycle parking is an economical use of urban space.



Convenient bicycle parking at a commercial establishment



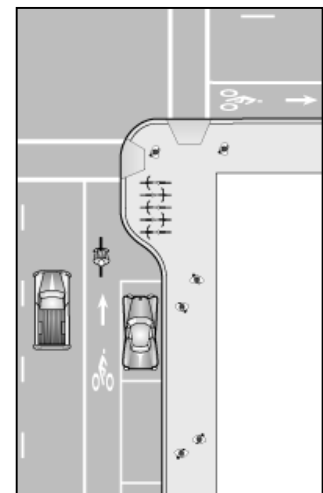
The dimensions of bicycle parking, ODOT, 1995

Bicycle parking should also be provided along sidewalks in high activity areas like Mesa Town Center. Care should be taken to ensure that the bicycle parking doesn't block pedestrian walkways or encourage cyclists to ride on the sidewalks. In areas with large numbers of cyclists and inadequate parking, people will find alternative, often undesirable places to secure their bikes.



Inadequate bicycle parking in an urban setting

Bicycle parking provided away from the main sidewalk area



Bike Stations

Bike Stations are a relatively new concept in the United States, but have been used in Europe and Japan for years. The purpose of a bike station is to provide amenities and services for

cyclists, typically commuters, at a central location. The first bike station in the United States was initiated in Long Beach, California, in 1996. Since that time, bike stations have grown in popularity. Amenities at the Long Beach Commuter Bike Station include parking for 150 bikes, quality bicycle rentals and repairs, changing rooms, a gear and accessories shop, bike-transit information, an outdoor café and coffee bar, and a commuter bike club. It is located in downtown Long Beach along the City's Transit Mall, which provides convenient transit access for cyclists.

In conjunction with a planned transit center in the Mesa Town Center, the City should investigate the feasibility of including space for a Bike Station. On a smaller scale, the City has provided bike rest areas along canal paths, which are valuable amenities to the community.

Costs

The cost for on-road bikeways is included with the Street Plan. An additional \$750,000 per mile is included for shared use paths. The total capital cost for 60.5 miles of shared-use paths is \$45.4 million.

Bikeway Maintenance

Routine maintenance is an important component of an effective bicycle system, as bikeways are subject to debris accumulation and deterioration. Poorly maintained facilities discourage use, and negate the impact of the initial investment in the facility. Roadway surfaces that are adequate for automobiles can be problematic for cyclists. Rocks, potholes, branches, and glass can damage bicycle tires and wheels, and may force the cyclist into automobile lanes if debris accumulation isn't routinely removed.

Bikeways should be swept regularly, and streets with designated bicycle facilities should receive priority in routine sweeping cycles. In addition, bikeways should be inspected routinely for surface irregularities and to maintain the condition of signing and striping along the roadway.

Pavement overlays offer opportunities to improve the riding surface for cyclists, and to restripe the street with bike lanes. During overlays, ridges should not be left in the area where cyclists ride. Pavement work around at-grade railroad crossings should be closely monitored to ensure that bikeways remain smooth and passable for cyclists. Similarly, utility cuts can also be problematic for cyclists; cuts that run parallel to bicycle traffic shouldn't leave a ridge in the bicycle wheel track.

Bicycle Safety, Education, and Enforcement

Safety is a critical component of a comprehensive bicycle program. Cyclists are exposed to a number of factors, including the elements and auto traffic, when riding in public rights-of-way. While engineering solutions exist to help reduce the incidence of accidents, educating both motorists and bicyclists can also greatly curtail unintentional infractions and promote safe riding and driving practices.

The City of Mesa has instituted a number of excellent education forums to improve public knowledge and understanding of cycling. Extensive outreach efforts with school children are helping increase understanding and awareness of bicycling and overall traffic safety issues. During *Bike Week 2001*, the City was able to increase the visibility both of bicycling and of bicycling infrastructure. By offering a wide variety of events, the City endeavored to reach a broad audience including City employees, law enforcement professionals, engineers, planners, families, and elected officials. The City's Bicycle and Pedestrian Program was awarded the Maricopa Association of Governments Golden Spoke Award for outstanding Bike Week 2001 events. The following events were held between March 24 and April 6, 2001:

- Cubs Spring Training Ride
- Bike To Work Day
- Mesa Police Department obstacle course
- Viewing of bicycling movie "Breaking Away"
- Bike shop displays
- Bike On Bus demonstrations
- Mayor's Breakfast and Ride
- Bike To Lunch
- "The Anatomy of Bicycle and Pedestrian Crashes" workshop (a national workshop on cycling safety sponsored by the City of Mesa)

Programs currently being developed include the projected addition of 50 miles of new bicycle lanes between June 2001 and June 2003, a wrong-way bicycling prevention campaign, formation of a Bicycle and Pedestrian Subcommittee of the Transportation Advisory Board, a helmet giveaway program, and updating the City of Mesa Bicycle Map. In addition, the City is preparing to apply for a Bicycle Friendly Community designation through the League of American Bicyclists.

Other efforts can be undertaken to improve cycling safety, including bicycle safety educational outreach program for children. The City can increase its coordination with schools, insurance companies, and others to sponsor bike fairs and other activities to continue teaching children bicycle safety and "rules of the road." Finally, the City should explore grant opportunities to

develop safety towns (all day events set up in parking lots to teach children about biking and walking) to help promote bicycle safety.

Law enforcement is another necessary component of bicycle safety. Typical problems that can be addressed through interaction among citizen advocates, advisory boards, and City staff include motorists not yielding to bicyclists, motorists not giving bicyclists enough room on the street, bicyclists disobeying traffic signals, wrong-way riding, etc. Bicycle police, as used in Mesa Town Center, are an important part of the solution. Through community education and support of enforcement efforts, the City can help build respect between bicyclists and motorists.

7.0 PEDESTRIAN PLAN



The Pedestrian Plan is a modal element of the Mesa Transportation Plan. It establishes a coordinated strategy to improve the convenience and accessibility of pedestrian travel throughout the community. The plan is divided into the following sections:

- An overview of the importance of walking
- Pedestrian objectives and policies from the City's General Plan
- A summary of existing conditions
- A review of pedestrian facilities and design considerations
- A compilation of existing and future needs to improve the City's pedestrian system

The Importance of Walking

Walking is the oldest form of personal transportation, and is the most readily available form of exercise. It does not require a license, fare, or special preparation. Walking is also the most affordable form of transportation, and not only improves health and well-being, it benefits motorists, employers, the community, businesses, and the environment. Every trip made on foot instead of by car reduces pollution and traffic congestion, and helps improve personal health. Pedestrian activity brings visual security (physical presence of people that deters crime) to a community and enhances the attractiveness of commercial and recreational areas.

For the purposes of this plan, pedestrians include people of all ages who walk, sit, or stand in public spaces, whether by foot or in a wheelchair. Pedestrian trips include walking from one destination to another, such as from home to school. Most trips, even when taken on the bus or in a private auto, include walking - people must walk from their car to the store or from their home to the bus stop.

The number of people who walk regularly is an important measure of a city's quality of life. Sidewalks provide places for casual socializing, and businesses benefit when people stroll and window-shop. The presence of pedestrians in the community indicates that people feel safe and confident outdoors. The quality of the pedestrian environment is also an important economic consideration. Research by the Center for Livable Communities (The Economic Benefits of Walkable Communities, <http://www.lgc.org/center>) includes the following conclusions:

- **Walkability is a good investment** – Real estate values will increase faster over the next 25 years in pedestrian friendly communities.
- **Walkability increases property values** – Property values are higher in neighborhoods that are designed to reduce auto traffic and its associated nuisances (noise, high speeds, and air pollution).
- **Businesses are beginning to leave gridlocked, auto-dependent cities** – Companies are increasingly concerned with the quality of life impacts associated with traffic congestion, which has become an important consideration for retaining employees and managing business costs.
- **Walkability is good for retail sales** – Businesses benefit when the pedestrian environment is improved, both in terms of sales and property values.

Data from the 1990 National Personal Transportation Survey show that 40% of all trips are less than 2 miles in length, and 27.5% of all trips are less than 1 mile in length – a comfortable walking distance for many people. However, only 3.4% of all trips in Arizona were made by walking, suggesting a latent demand for walking in Arizona, and that more people would walk more often if the pedestrian environment was more attractive.

In recent years, alarming data has been released on the declining health of Americans. Reports by the American Cancer Society, the Center for Disease Control, and the Surgeon General have all shown that obesity, and its associated illnesses (heart disease, diabetes and hypertension) is now an epidemic in this country, even among children. Walking provides an excellent opportunity for physical exercise, and doesn't require any special skills or equipment (except for those using a wheelchair). Some community leaders are calling for constructing more public gyms and parks, which is a good idea, but if people choose to drive to the facilities, a key element of the solution has been lost.

Existing Conditions

Pedestrian travel in the City of Mesa typically occurs on sidewalks adjacent to a City street. The current City of Mesa Design Guidelines require 4-foot sidewalks on all residential streets and 5-foot sidewalks on collector and arterial streets. Most City streets have sidewalks, which is favorable compared to many other communities. Missing segments of sidewalks that do exist along arterials will be built as the adjacent properties are developed.

Many trip destinations are located along busy arterial streets where sidewalks are typically immediately behind the curb. Some areas have sidewalks that are separated from the curb, which provides a more inviting walking experience. The interior sidewalks of the Town Center area between Country Club and Mesa Drive and between University Drive and Broadway Road have been enhanced with setbacks, landscaping, awnings, and mid-block crossings, making the Town Center area a pleasure to walk.

Pedestrian access between the sidewalk and adjacent businesses is frequently hindered by auto-oriented development patterns and a lack of pedestrian amenities. For example, the typical strip shopping center is separated from the adjacent street by walls and large parking lots with few or no shade trees, and no designated walkways. Pedestrian access is provided at vehicular driveways, where people on foot have to negotiate their way between parked cars, cars backing up, and oncoming traffic before reaching their destination.

Safety

Safety is a critical concern for pedestrians in this country. In a report by the Surface Transportation Policy Project (MeanStreets 2000, www.transact.org/Reports/ms2000), researchers found that in 1997 and 1998, 10,696 pedestrians died in the United States, representing 13 percent of all traffic fatalities. Locally, the report ranked the Phoenix-Mesa area as the sixth most dangerous metropolitan region in the United States for pedestrians, with 190 pedestrian fatalities between 1997 and 1998.

Traffic crash statistics for the City of Mesa since 1991 show that an average of 11 crashes involving pedestrians occur every month. People 65 years of age and older account for 13 percent of the total population, yet, according to a 1991 survey they make up over 22 percent of all pedestrian fatalities in this country. Older adults are not necessarily involved in more pedestrian crashes, but because of physical vulnerabilities, they are much more likely to die from their injuries.

The very young also have unique problems with the pedestrian environment. They often live within walking distance of their school but have to cross busy, wide streets to get there. Their

smaller stature makes them difficult for motorists to see, and their lack of experience make them more likely to dart into traffic without looking, or to misjudge the speed and distance of oncoming cars. As mentioned previously, rising obesity rates among children can at least partially be linked to the declining pedestrian environment in America.

Pedestrian Oriented Design

In recent years, there has been a renewed interest among elected officials, planners, and citizens in building communities for people rather than for automobiles. Several names have been attached to these “new” urban design principles – smart growth, neotraditional development, new urbanism, pedestrian-oriented development, and transit-oriented development, to name a few. For all practical purposes, though, they are intended to achieve the same thing:

- Human-scaled, walkable neighborhoods and commercial areas
- Compact, mixed-use development patterns
- Sustainable development practices
- A sense of place through sound planning and urban design principles
- Integrated travel modes that emphasize convenience and accessibility for pedestrians, bicyclists, and transit users

Pedestrian-oriented design embodies the notion that transportation and land use planning must be linked to provide a safe and convenient walking environment. It is characterized by the creation of attractive, interesting places for people to gather, accessible sidewalks and walking paths, buildings oriented to the street, protection from auto traffic, and protection from inclement weather (in Mesa, this usually means shading from the hot desert sun). Pedestrian-oriented design should not be pursued as a means to exclude automobiles; rather, it should incorporate auto travel as a component of the overall transportation system.

Several communities have created very effective pedestrian-oriented design guidelines. Locally, the Maricopa Association of Governments has developed Pedestrian Area Policies and Design Guidelines, and the Regional Public Transportation Authority prepared Pedestrian-Oriented Design Guidelines that are intended to serve as models for area Valley Communities. Both documents provide valuable design information, and were considered in preparing the Pedestrian Plan.

Throughout the Phoenix-Mesa metropolitan area, conventional residential and commercial development patterns are evident from their standardized building formats and monotonous suburban tract neighborhoods. Over the past several decades, this off-the-shelf approach to

community design has made walking increasingly inconvenient. Following is a short explanation of the drawbacks to conventional development patterns, and the advantages of traditional, pedestrian-oriented development.

Commercial Development

Conventional commercial land uses are characterized by strip development patterns and chain retail architecture (Figures 1 and 2). Typical elements include a building that is separated from the street by a large parking lot, physical separation from adjacent land uses, and an overall lack of pedestrian amenities. Pedestrians are forced to travel greater distances to their destinations, and to mix with auto traffic. As shown in the photos below, people living in a high-density residential area adjacent to retail business would have to walk to the arterial street and back through a busy parking lot, making even the shortest pedestrian trips unlikely.



Problems for pedestrian and transit access associated with conventional retail development

Conversely, traditional development projects provide a convenient, enjoyable pedestrian environment (see photos on next page) with a mix of uses (either on-site or nearby). Buildings face the street, providing horizontal spatial definition and direct front door access from the sidewalk. Automobile access is provided, although it is integrated as a part of the overall design, rather than as the dominant theme. On-street parking is provided, and on-site parking is either behind or adjacent to the building. Pedestrians have the opportunity for window-shopping and social interaction along the sidewalk. Amenities such as awnings, benches, and pedestrian level lighting make walking more convenient. The distance pedestrians must travel to reach their destinations is greatly reduced, making transit access quick and convenient.



A mixed-use development provides an inviting pedestrian environment.



Traditional development provides front door access, is oriented to street, and parking is adjacent to building and on-street.

Neighborhoods

The design of new residential neighborhoods has undergone vast changes over the past 50 years. Today, conventional residential tract development is characterized by wide streets, a disconnected network of cul-de-sacs and loops, attached sidewalks, walled neighborhoods, and “garagescape” architecture, the most dominant feature of which is the garage; the traditional front porch has retreated to a small space outside the front door. Conventional neighborhoods are usually segregated from nearby commercial uses by concrete walls and arterial streets. Many conventional subdivisions back up to arterial streets, necessitating the placement of a continuous wall that creates a tunnel effect, which in turn increases the perception of the street as the domain of the automobile. (This also removes ‘eyes on the street’, which can be a deterrent to crime.)

Alternatives to the conventional residential neighborhood have developed in recent years. So-called neotraditional design is geared toward creating more sustainable, pedestrian friendly neighborhoods. Key design features include an interconnected network of narrower streets and



Wallscape / garagescape environment prevalent in conventional development lacks visual interest for pedestrians.



A neotraditional neighborhood provides visual interest and convenience for pedestrians.

smaller blocks, detached sidewalks, alleys with rear loading garages, and pedestrian access to nearby neighborhood commercial uses. Homes in neotraditional neighborhoods include a variety of architectural styles. Residential and commercial uses are blended together rather than strictly separated as in conventional neighborhoods.

Pedestrian Facilities and Design Considerations

As discussed previously in the Street Plan, a safe, inviting pedestrian realm is a crucial part of multi-modal street design. A well-designed pedestrian realm provides the following:

- Continuous, interconnected pedestrian travel corridors
- Convenient pedestrian access between commercial and residential land uses
- Convenient access to transit facilities
- A physical buffer between adjacent land uses and noise from street traffic
- Visually interesting and inviting public spaces for exercise and social interaction

Key considerations when designing the pedestrian realm include safety, comfort, ease of access, and relationships to other elements of the street realm. The pedestrian realm provides spatial definition to the street, and helps reduce the dominance of auto traffic. Adjacent land uses should be oriented to the street to focus pedestrian activity and to improve access to transit facilities.

Following is an overview of the design elements for specific components of the pedestrian realm – sidewalks, pedestrian amenities, on-street parking, landscaping, public transportation, street crossings, and shared-use paths. Each element is discussed in terms of general issues and more specific design considerations. Further review will be necessary to determine how and where the guidelines would be applied in the City of Mesa. For example, the provision of pedestrian amenities (e.g., benches and water fountains) may be appropriate for activity areas like Town Center, but not for less intensely developed areas.

Sidewalks

Sidewalks are the most basic element of the pedestrian system, and provide access to adjacent land uses, transit facilities, and on-street vehicular parking. Sidewalks provide more to the community than simply moving people on foot; they provide space for vital social interaction, window-shopping, bicycle parking, and space for pedestrian amenities.

General Issues

Sidewalks that are detached from the curb provide an additional buffer for pedestrians from automobile traffic, which increases the feeling of personal safety. Attached sidewalks create an uncomfortable feeling of vulnerability due to the proximity of automobile traffic, greatly reducing



Detached sidewalks provide a welcome buffer between pedestrians and vehicles



Attached sidewalks are less desirable for pedestrians

the pedestrian experience (and also reducing use of the facility). The one exception to this rule is in activity areas like Mesa Town Center, where wide sidewalks are needed because of high pedestrian demand. However, higher concentrations of ground level retail activities create higher pedestrian volumes, and automobile speeds are typically much lower.

Sidewalks should provide the most direct connection possible between a pedestrian's origin and destination. This concept is especially important in Mesa's hot desert climate, where walk distances may be limited during the summer months. Sidewalks that are detached from the curb should follow the contour of the street. Deviations under certain circumstances (e.g., to avoid an existing landscape feature) may be necessary, but should be gradual, and should be minimized.



Sidewalks should follow the adjacent roadway; gradual meanders may be acceptable.



Sidewalks that meander unnecessarily are less pedestrian friendly, especially for the elderly and those with disabilities.

Design Considerations

- All sidewalks should be continuous and interconnected, and should be provided on both sides of the street.
- In areas outside activity centers, sidewalks should be detached from the curb to provide space and comfort for pedestrians.
- Sidewalk width should be determined based on the use and amount of activity that is expected.
- The preferred width of a sidewalk is 12 to 15 feet in commercial and mixed-use areas with storefronts close to the street. The minimum width in these areas is eight feet.
- All sidewalks should provide a minimum five-foot clear zone, as required by the Americans with Disabilities Act to allow passing space for wheelchairs. ADA requires a wheelchair passing space every 200 feet along public walkways.
- Pedestrians want to walk in the shortest distance possible – meandering sidewalks should be avoided. Landscaping, pedestrian amenities, and other features can provide a more visually interesting atmosphere without forcing pedestrians to walk longer distances.
- Sidewalk widths of greater than 12 feet provide space for pedestrian amenities and for local business activity to spill out onto the sidewalk.
- Ensure the area dedicated to pedestrian through traffic is not obstructed with street furniture, utility poles, garbage cans, traffic signs, or vegetation.
- The surface of sidewalks should remain level and continuous, even at driveways. This signals to the drivers that they are crossing the pedestrian realm, and must yield accordingly.
- Vehicular access to adjacent land uses (curb cuts) should be consolidated to minimize auto/pedestrian conflict points.
- General maintenance (e.g., fixing potholes and broken sidewalks) is crucial to the pedestrian experience, both for physical safety and to provide an overall sense of security.
- Sidewalk should not be combined with bikeways unless the facility is specifically designated as a shared-use path with a preferred 12-foot width.
- Materials and construction methods should be selected that consider long-term maintenance and appearance.

Pedestrian Amenities

Sidewalk amenities serve pedestrians and outdoor activities. Additional streetscape features, such as lighting and signing for motorists, are typically placed within the sidewalk environment, and should be integrated with the overall pedestrian realm.

General Issues

Pedestrian amenities include items like benches, water fountains, shade structures, information kiosks and maps, transit stations, and trash receptacles.

Pedestrian amenities increase the convenience of the pedestrian environment. Selecting, designing, and placing amenities requires special consideration. Their placement shouldn't necessarily be uniform; rather, they should be located where they're needed, and should be flexible as the area changes over time.



A well-designed pedestrian environment using the street for café space.



Large blocks prevalent throughout the Valley provide opportunities for pedestrian plazas and gathering areas.

Design Considerations

- Provide areas for people to gather in informal settings to enjoy the outdoors. Ensure that seating is well located and comfortable.
- Pedestrian plazas, benches, café tables, bus shelters, special landscaping, etc., should be provided along public streets to give people an opportunity to socialize and spend time outdoors.
- Special pedestrian areas, such as the Pedestrian Overlay Area in Town Center, require special consideration for pedestrian amenities, including pedestrian level lighting. Pedestrian amenities should be placed for the length of the special use area, and typically with much greater frequency.

On-Street Parking

On-street parking is a feature of many well-designed streets. It is located between the curb and the outside travel lane (or bicycle lane on some streets), and is usually either parallel or diagonal to the curb.

General Issues

On-street parking supports area businesses and improves pedestrian safety by providing a buffer from busy street traffic. It also visually narrows the street, signaling drivers to slow down.

On-street parking should be provided to help meet the needs of adjacent land uses. In regional activity centers with higher density development, additional public or shared parking structures will be needed. Parking below grade is preferred to above grade structures to preserve street level space for commercial activities.



Landscaping and on-street parking visually narrow this downtown street.



Angle parking in a well-designed streetscape.

On-street parking can significantly impact performance of the travelway realm, both for autos and bicycles. The provision of on street parking should be balanced with local access needs and through traffic requirements.

Design Considerations

- The standard parking lane width for parallel parking is seven feet; the maximum width is eight feet.
- Consider extending sidewalks or curbs at transit stops to an equal width of the on-street parking lane to increase pedestrian access.
- To minimize urban space used for vehicle storage in activity centers, consider including on-street parking towards requirements for adjacent uses, particularly in pedestrian activity areas.

Landscaping

Natural vegetation, in particular trees, provides an important element to the pedestrian experience. Trees provide shade, help buffer pedestrians from busy streets, and help establish

rhythm and character. Ground cover, shrubs, and flowers also add character, and help provide texture and scale along pedestrian ways.



A detached sidewalk with trees and shrubs buffers pedestrians from street traffic



Drought tolerant landscaping reduces water needs

General Issues

Natural landscaping in medians helps break up the “sea of asphalt” prevalent with many Valley arterial streets. Planter strips should be provided between the curb and sidewalk in areas where pedestrian demand is less, and provide excellent opportunities for trees and shrubs to enhance walking. In particular, the walking environment along busy arterials can be greatly enhanced with detached sidewalks and trees and shrubs added to the planting strip, which gives the pedestrian an increased feeling of safety.

Vegetation used along public streets should reflect the identity of the Sonoran Desert, and should follow xeriscape principles that minimize water needs.

Design Considerations

- Maintain adequate safety standards, including sight distance, in the design of natural landscapes.
- Use drought tolerant trees and shrubs, perennials, and groundcovers cited in the Arizona Department of Water Resources low-water using plant list.
- Trees should typically be planted between 15 and 25 feet apart, depending on species, to maintain a continuous tree canopy.
- Landscape strips with trees should be at least eight feet wide. Landscape strips with some tree types, or with shrubs and ground cover may be less than eight feet.
- Provide adequate funding and resources to maintain investments in landscaping.

Street Crossings

Street crossings provide important connections along pedestrian routes. Excessively wide intersections often divide areas of the community, and discourage pedestrian traffic. Excessive pedestrian crossing distances also negatively impact automobile traffic, as longer walk cycles are required to allow the pedestrians to safely cross the street. In some instances, curb extensions or bulb-outs may be used to shorten the distance pedestrians must travel, both at corner intersections and mid-block crossings.



Wide intersection crossings discourage pedestrian use.



Curb extensions shorten the distance pedestrians must travel to cross the street.

Design Issues

Key elements in developing a pedestrian friendly environment at street crossings include the width of the street, geometry of the intersection, volume of pedestrian and auto traffic, right of way constraints, and frequency of crossing opportunities. In many instances, improvements for pedestrians (and bicyclists and transit users) require trade-offs with vehicular through capacity. Equal consideration should be given to pedestrians when designing and constructing intersection improvements.

Curb radii affect the speed of auto traffic. An intersection with a shorter radius forces drivers to move more slowly when making turns, which is desirable in high pedestrian areas. Issues to consider when establishing curb radii requirements include pedestrian and auto traffic volumes, and the size of large vehicles expected on the street.

Mid-block crossings are sometimes necessary to allow pedestrians to cross large streets in areas with infrequent intersections or where the nearest intersection would require the pedestrian to travel a significant distance out of their way. Properly designed and visible mid-block crosswalks warn drivers that pedestrians frequent the area. Features such as push buttons for pedestrians to activate the traffic signal and pedestrian level lighting help improve the convenience of mid-block crossings.

A thorough analysis should be employed to evaluate a proposed mid-block crossing before installation. Issues to be considered, as part of a nationally recognized “warrant” system, include sight distance, vehicle speed, accident history, lighting, traffic volumes, types of pedestrians, adjacent land uses, etc. Improperly installed mid-block crossings can result in the following: 1) disruption of traffic flow that increases the potential for rear-end collisions; 2) proliferation of crosswalks that cause pedestrians to use conventional intersection crossings less frequently; and 3) creation of a false sense of security among pedestrians, causing them to be less alert as they cross busy streets. However, installing a mid-block crossing when specific warrants are met can: 1) help direct pedestrians to cross at the safest mid-block location; 2) provide visual cues to approaching motorists to anticipate crossing pedestrians and unexpected stopped vehicles; and 3) provide pedestrians with reasonable opportunities to cross busy streets during heavy traffic periods.

Design Considerations

- Traffic signals should be set at a cycle frequency that dissuades jaywalking.
- The types of pedestrians using crosswalks, in particular children and the elderly, should be considered in establishing pedestrian crossing times at signalized intersections.
- Two ADA compliant wheelchair ramps should be provided at each corner of an intersection. In locations with center medians, an ADA compliant channel must also be provided.
- Curb radii at intersections in pedestrian activity areas should be 10 feet to 20 feet.
- In pedestrian areas, sidewalk bulb-outs should extend into the street for the width of the parking lane (or a minimum of five feet) to reduce pedestrian walking distance, increase pedestrian visibility, provide more space for pedestrian queuing, and to provide a place for sidewalk amenities and landscaping. Curb bulb-outs are also useful to calm traffic by visually narrowing the street and by slowing the movement of drivers making right turns.
- Depending on specific site conditions, consider mid-block crossings when the spacing of signalized intersections is greater than 660 feet and pedestrian travel demand in the area is high.
- Mid-block crossings are generally discouraged on streets with a speed limit of 45 mph or greater.

Shared Use Paths

Shared use paths typically are located along open space corridors such as canal banks and utility corridors. Shared use paths are usually shared by all types of non-motorized forms of transportation including walkers, cyclists, equestrians, joggers, in-line skaters, baby carriages, etc. Additional design information and the location of proposed shared use paths are listed in the Bicycle Plan and the City’s Parks and Recreation Master Plan.

Transit

Pedestrian improvements are needed to connect public walkways and adjacent land uses with transit centers, bus stops, light rail stations, and park-and-ride lots. The pedestrian amenities discussed above, including shade and benches, help ensure the facilities are comfortable and safe for transit passengers waiting for their ride. Refer to the Transit Plan for additional information on pedestrian friendly transit facilities.



Convenient pedestrian access to light rail transit



Direct pedestrian access is provided to this local park-and-ride lot

Other Design Issues

There are numerous other design issues that impact the quality of the pedestrian environment. Each should be considered when developing pedestrian oriented design standards: 1) removing barriers; 2) maintenance and construction practices; 3) buffers, fences, and soundwalls; 4) site access control; 5) on-site parking; 6) designing for the elderly; 7) traffic calming; and 8) climate issues.

Removing Barriers

Improving the pedestrian environment often requires finding solutions to physical barriers. Barriers are either permanent physical features (e.g., canals, railroads, retention basins, retaining walls, narrow bridges, and freeways) or temporary, as in the case of trash pick-up day in many neighborhoods. Low brick crosswalks can also be hazardous to wheelchair-bound pedestrians and the visually-impaired. Solutions can include alternate routing, design modifications, or new pedestrian overpasses or underpasses.



The placement of trash containers makes sidewalks unusable for pedestrians.



A bridge provides access across a canal for bicyclists and pedestrians.

Maintenance and Construction

Pedestrian facilities that are not maintained can be deterrents to walking. Walkways, traffic signs, and traffic signals all require routine maintenance to ensure proper working order. In addition, vegetation should be routinely trimmed to maintain adequate sight distances at intersections and driveways. Adequate funding and maintenance practices are needed to preserve walkways in a smooth, clean, and safe condition.

Buffers, Fences, and Soundwalls

Buffers, fences, and soundwalls provide physical separation between the public right-of-way and adjacent land uses, and can be used to enhance the overall appearance of roadways. Fencing and soundwalls should not isolate neighborhoods. Ideally (for bicycle and pedestrian access), breaks should be provided at a rate of 12 to 14 per mile, with a maximum spacing of 660 feet.

Site Access Control

The point at which sidewalks cross driveways is a primary conflict point between pedestrians and vehicles. It is therefore important to minimize the number of driveways that serve adjacent land uses. The City's design standards should be evaluated to ensure that access controls are adequate. Issues to consider include requiring one-way entries and exits and strategies to consolidate driveway locations.

On-Site Parking

As previously discussed in the section on Commercial Development, the design of on-site parking is an important part of the pedestrian environment. Properly designed parking areas accommodate pedestrian circulation, as well accommodating the car. Conversely, poorly designed, over-sized parking areas are difficult for pedestrians to negotiate, and contribute to the mental perception of an auto-dependent society. Parking requirements should be evaluated

to reduce excessive requirements, and to institute maximum standards as well as minimum standards.



The number of driveways should be minimized to reduce pedestrian/auto conflicts.



A typical shopping center parking lot, as seen from near the adjacent street.

Elements to consider in designing pedestrian friendly parking areas include the following; 1) clearly delineated walkways that are separated from traffic lanes (preferably between rows of head-in parked cars) ; walkways should provide direct access from the street and between buildings; 2) landscaping that delineates pedestrian walkways and helps visually reduce the size of the parking lot; 3) screening to reduce the visual impact of the parking area; and 4) internal circulation and shared parking between adjacent land uses.

Designing for the Elderly

The population of Maricopa County residents 60 and older is expected to rise from approximately 500,000 in 2000 to 1.2 million by 2025. Pedestrian design standards that consider the special needs of the elderly will become increasingly important in the future. Clear, unobstructed walkways, longer crossing times at intersections, higher lighting levels, lane markings, and larger, brighter signs are just a few of the issues that are important to the elderly population.

Traffic Calming

With continued growth, residential traffic is an increasing concern in Mesa. When arterials become congested, motorists often look for short-cuts through residential neighborhoods. Neighborhood traffic calming techniques (e.g., speed humps, traffic circles, narrow streets, curb extensions, chicanes, and diverters) are designed to help reduce cut-through traffic and excessive speeds in residential areas, greatly improving the pedestrian environment.

Traffic calming is a relatively new concept in Mesa. Additional research and funding should be allocated to help manage residential traffic in existing neighborhoods, and new designs should reduce the need for potentially expensive retrofits in the future.

Climate Issues

Locally, it's a common perception that people don't walk very much because of the climate; people say it's just too hot. In reality, though, Mesa's climate compares very well with other cities, in terms of the number of days per year when the temperature is favorable for walking (imagine walking to work in Boston or Minneapolis in January). Even during the hottest three months of the year, when temperatures typically are above 100 degrees, the evenings are reasonably comfortable for pedestrians (another advantage over cold climates, where evening temperatures are even lower than in the daytime).

Even people who drive an auto are subjected to the environment, when they leave their vehicle and complete their trip on foot. While walk trips may be made less frequently and for shorter distances during the summer, the design of transportation facilities and adjacent land uses should consider the comfort of the pedestrian.

Mesa's desert climate does present specific challenges to the designer working to create a comfortable pedestrian environment. Of primary interest is providing continuous or nearly continuous shade along walkways and in pedestrian areas. Landscaping can be used to provide shade, and to mitigate reflective heat along walkways. Mist systems are another option for improving the comfort levels of pedestrians.

Existing and Future Needs

Recommendations for future pedestrian improvements should center on improving the accessibility and convenience of the overall pedestrian environment. This will require developing and implementing pedestrian-oriented design standards, both for capital roadway improvements and for the design of future development and redevelopment projects. The level to which the City is able to retrofit existing transportation facilities will vary according to existing site conditions, financial resources, and community support. For example, when constructing a street improvement project, it may be cost prohibitive to obtain enough right-of-way to include a detached sidewalk. However, the design guidelines should be considered a starting point in developing a more enjoyable and convenient pedestrian environment.

The City of Mesa typically constructs pedestrian improvements as part of overall street construction projects. Capital projects that will enhance the pedestrian environment are included in the Street Plan, Bicycle Plan, and Transit Plan.

Previous arterial landscaping projects typically cost approximately \$525,000 per mile to construct. The Plan allocates \$750,000 per year to fund an ongoing arterial landscaping program to enhance this component of the pedestrian environment.

In developing new pedestrian design standards, the City should consider the following elements:

- Development of an interconnected, local street network
- Integration of the pedestrian system with other modes of travel
- Community design principles that provide equal consideration for pedestrians
- Integration of land uses through neotraditional design principles
- Incentive programs for pedestrian-oriented infill and redevelopment projects
- Integration of appropriate pedestrian amenities into the pedestrian realm
- Funding and maintenance procedures to keep the pedestrian system in good working order
- Building setback and orientation requirements that help create active, pedestrian frontages
- Parking design requirements that enhance pedestrian access
- Identification and elimination of barriers to pedestrian travel
- Changing design needs associated with the projected increase of elderly residents in Mesa
- Traffic calming practices for both new and existing development
- Specific design requirements associated with Mesa's desert environment

8.0 TDM PLAN



Travel Demand Management

Travel demand management (TDM) includes a variety of strategies to encourage more efficient use of existing transportation systems. TDM measures affect the demand side of transportation as opposed to the capacity. TDM programs are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel. To accomplish these types of changes, TDM programs must rely on incentives or disincentives to make these shifts in behavior attractive.

TDM can provide multiple benefits, including reduced traffic congestion, road and parking facility cost savings, user financial savings, increased road safety, increased travel choice (especially for non-drivers), increased equity, reduced pollution, and energy savings. TDM includes strategies that increase the quantity of travel alternatives such as transit, ridesharing, walking, bicycling, telecommuting and delivery services; strategies that reduce the need for travel by creating more efficient land use; and strategies to reward consumers for using the travel option that is most cost effective overall.

Maricopa County Requirements

Trip reduction is a requirement for major employers located in air quality non-attainment areas. The original Maricopa County Trip Reduction Ordinance (TRO) was written in 1989, and amended May 26, 1994 by the Maricopa County Board of Supervisors, setting an annual goal of reducing single occupancy vehicle (SOV) trips by 10% per year for the first five years, and then a 5% reduction per year for the following three years. There are 72 major employers in the City including the City of Mesa (many with multiple work sites) that are required to submit trip reduction plans to the County under the TRO. According to the Maricopa County Rideshare Coordinator for the Mesa area, only a small percentage of those sites have reached their target goals. Currently, there are no direct penalties for not reaching trip reduction targets, for the City, other major employers, or their employees.

Ridesharing: Carpools And Vanpools

Carpooling is the sharing of rides in a private vehicle among two or more individuals. Vanpooling is a similar sharing of rides but uses a different type of vehicle. Carpooling programs exist at many employment sites throughout the Valley. Vanpools are supported by some employers and are provided by RPTA.

HOV Lanes

While HOV lanes are part of the supply side of the transportation system, they also affect the demand. The use of the lanes is restricted to vehicles with two or more people. The advantage to the users is travel time savings. The advantage to the system is higher vehicle occupancies and fewer vehicles using a facility. Currently, there are HOV lanes on Loop 202 from I-10 in central Phoenix to the Loop 101 interchange in Tempe. HOV lanes are under construction on US 60.

TDM Strategies

TDM strategies can be grouped into three categories: alternatives to the single occupant vehicle, incentives and disincentives, and alternative work arrangements. The strategies that can be applied on a local level are described below.

Telecommuting

Telecommuting is broadly defined as using communications technology to replace commuting. It typically means that employers allow certain employees to work at home or at a local workstation either part- or full-time. It often requires at least some additional equipment, although as computers and communications equipment become more common and portable, incremental costs decline.

Alternative Work Hours

Flexible work hours ("flextime") can reduce peak period congestion directly and employees often report that rigid schedules (such as needing to punch a time clock at a particular time) are a barrier to rideshare and transit use. Compressed workweeks, such as four workdays of ten hours (a "4/40" schedule), reduce commuting trips by 20%, although it can increase non-work, off-peak automobile trips. These scheduling options tend to be valued by employees, provided that they are optional.

Parking Pricing

Those sites with the best TDM program results are those where parking is restricted or managed in some way. Applying a surcharge for parking on top of restricting parking availability is a sure means of influencing the choice of travel mode. The value of employer-paid parking is so substantial that it encourages commuters to drive to work alone.

Parking Supply

A generous parking supply is required by most zoning laws, resulting in oversupply in some locations. This gives businesses little incentive to encourage TDM. Mixed land use allows parking supply reductions since some uses have weekday peaks, while others have evening and weekend peaks. Application of a shared parking concept to the calculation of parking requirements can result in lower parking supplies.

Parking spaces can be used as an incentive for carpools and vanpools. The closest spaces to the building can be reserved for carpools. Another option is to provide covered spaces for carpools.

Employer Programs

A deterrent to some TDM strategies is the need for a vehicle during the workday. Some people may be reluctant to carpool if they have midday trips to make. They may also be concerned about getting home in an emergency. Employers can provide programs for midday and emergency transportation that would eliminate employees' need for their own vehicles during the day. This would then make ridesharing a reasonable alternative. Employers can also provide financial subsidies for transit riders that would encourage its use.

Higher Density/Mixed Use/Growth Areas

Increased residential and employment densities, mixed land use, and jobs-housing balance can reduce total vehicle travel as common destinations (stores, services, jobs) become closer together. This is called "access by proximity." These benefits occur in both urban and suburban areas. For example, a household in a low density, auto-oriented suburb will make, on average, 7.7 vehicle trips per day, while the same household in a higher density, transit-oriented suburb will make 6.05 vehicle trips per day, a 21% reduction in personal travel. A variety of

specific land use strategies can help reduce vehicle travel. The United Kingdom is using land use management as a key strategy in reducing transportation carbon emissions and other environmental impacts.

Neotraditional Neighborhoods And Transit-Oriented Development

Neotraditional neighborhood design emphasizes small-scale blocks, an interconnected street network, good pedestrian and bicycle facilities, and moderate to high density mixed land use. Research indicates that residents in such neighborhoods have significantly fewer automobile trips than residents in automobile dependent areas.

Transit oriented design places higher density development within reasonable walking distance of high quality transit service and design features to support a variety of modes. Services frequently used by commuters should be located at transit and employment centers, including childcare, cafés, and shops. Some transit-oriented neighborhoods, such as Peter Calthorp's Pedestrian Pockets, are designed as a unit, but this is not always possible since most urban development occurs incrementally.

Transportation-Efficient Development

Transportation-efficient housing is located to be accessible to common services (shops, schools, etc.), jobs and transit service. This allows households to reduce their automobile ownership expenses. Location-efficient mortgages are those for which lenders consider the household transportation cost when assessing mortgages. This provides an added incentive for households to choose transportation-efficient housing. Some planners are experimenting with "car free" housing developments specifically designed to accommodate households that do not own a motor vehicle and take advantage of community benefits of reduced vehicle traffic (such as using land that would be needed for parking in an automobile-dependent area for common green space).

Potential Travel Reduction

The development of a TDM program can involve a combination of strategies. The strategies, when applied together, are complementary actions. For example, a ridesharing program can be more effective if there is preferential treatment provided en route (HOV lanes) and/or at the destination (preferential parking). The program would be enhanced further if developments were required to incorporate ridesharing activities into their design. A TDM program should be a package of strategies that complement one another.

The potential impact of some strategies, based on experience in other areas, is noted below. The combination of strategies does not result in an additive reduction in drive-alone trips.

TABLE 8-1
POTENTIAL TRAVEL REDUCTIONS

STRATEGY	REDUCTION
Employer paid parking	2-12%
Financial subsidy for transit	2-8%
Provide midday transportation	2%
Emergency ride home program	4%
Walk accessible services	3%
Preferential parking for HOV's	1%

9.0 TOWN CENTER PLAN



Background and Purpose

The Town Center Transportation Plan supports development of a vibrant downtown that is accessible to all Mesa residents and visitors. All modes of travel are included in this plan, and specific improvements are recommended to enhance the overall transportation system.

The Town Center Transportation Plan evaluates several future transportation alternatives that could impact how the transportation system accommodates anticipated growth and development in downtown Mesa. The area is generally bounded by University Drive to the north, Broadway Road to the south, Country Club Drive to the west, and Mesa Drive to the east. The transportation system design alternatives focus on four primary elements:

1. Traffic network capacity changes to accommodate future travel demands
2. Potential street modifications in downtown to improve all modes
3. Location of a downtown transit center
4. Preliminary evaluation of potential light rail alignments

The downtown area of the City of Mesa has been the subject of previous study and recently, the character of Main Street has changed to provide a stronger pedestrian focus. A Concept Plan was completed for the Mesa Town Center Redevelopment Area in January 2000. The goals presented in the plan include higher density downtown neighborhoods, urban plazas, and preservation of historic neighborhoods. The plan identifies recommended land uses for the downtown area as well as transportation elements and parking structure locations.

Specifically, the Concept Plan supports light rail transit in the Town Center, with a potential for extensions east on Main Street and/or south on Center Street. The Concept Plan identifies the potential location of three rail stations and a transit center shown along Main Street between Country Club and Mesa Drive. The plan also includes conceptual pedestrian linkages.

Future Transportation Analysis

The future transportation analysis was based on a growth scenario (2025) developed by City Redevelopment staff, within the framework of the Town Center Concept Plan. Coupled with continued growth around the Town Center area, there will be a significantly higher demand placed on the future transportation system. Future development included as part of the future transportation analysis included the following:

Residential.....	1,100 units
Office	1,627,000 square feet
Retail	469,000 square feet
Restaurant	10,000 square feet
Hotel	200 rooms
Library expansion	10,000 square feet
Convention center	40,000 square feet
Aquatic center	130,000 square feet
Arts center	1,600 seats

A detailed operational analysis of the Town Center area was conducted to examine several transportation options. The analysis included intersection level of service calculations and a micro-simulation analysis (a specialized traffic program that models every car and transit vehicle). The simulation provides a quantitative evaluation of auto, bus, and light rail operations based on specified scenarios. In addition, several street improvements (e.g., street widening and intersection widening) were evaluated.

Network Alternative Analysis

A series of alternative network scenarios was tested for the year 2025 weekday PM peak hour conditions. The following is a list of the four primary alternatives investigated as part of the study:

1. **Street Narrowing on 1st Avenue, 1st Street, and Center Street** – an investigation of the potential impacts of narrowing streets to provide an enhanced pedestrian and multi-modal environment in the core of downtown Mesa.
2. **Roundabout Traffic Control along 1st Avenue and 1st Street** – an evaluation of potential roundabout installation in lieu of other traffic control devices was investigated for 1st Avenue and 1st Street at Robson, Center, and Hibbert.
3. **Light Rail Alignment Double-Track on Main Street** – a preliminary assessment of light rail train and traffic operations associated with an alignment that is double-tracked along Main Street.
4. **Light Rail Alignment on 1st Avenue and 1st Street** – a preliminary assessment of the light rail train traveling eastbound on 1st Avenue and westbound on 1st Street crossing Main just east of Country Club and west of Mesa Drive.

Analysis Results and Recommendations

1. In any future scenario, the traffic generation and associated access from the area generally bounded by Country Club and Macdonald, and Main and 1st Avenue, create operational issues at the intersections of Country Club/Main, Country Club/1st Avenue, and 1st Avenue/Robson. For all scenarios parking garages that propose to access Center Street create operational issues along the narrowed Center Street at key intersections such as 1st Avenue and Broadway. Thus, it is recommended that primary garage access be on the minor streets in the downtown area.
2. While travel times along the primary arterials increase with the narrowing of 1st Avenue, 1st Street, and Center Street (between 1st Avenue and 1st Street), future year 2025 travel demands can be accommodated without creating bottlenecks that inhibit circulation and access in the downtown area.
3. Given the level of traffic demands throughout the downtown area, a roundabout at the intersection of Center Street and 1st Avenue does not provide adequate capacity to keep traffic circulating throughout the downtown area. From the simulation modeling it was observed that the roundabout at Center Street and 1st Avenue created bottlenecks and queues that extended into adjacent intersections. Roundabouts at other intersections along 1st Street or 1st Avenue (e.g., Robson, Macdonald or Hibbert) are less problematic in terms

of system-wide traffic operations, but would require additional analysis to determine if they would provide adequate crossing opportunities for pedestrians (in particular, the sight impaired).

4. The light rail alternatives were compared against one another and included the street narrowing as a part of the alternative. For the planning level assessment completed as part of this study, no fatal flaws relative to traffic operations were identified for either light rail alternative alignment.

The east-west travel times along Main Street are not significantly affected as a result of the Main Street alignment, considering that a significant amount of through traffic is diverted to 1st Street, 1st Avenue, University Drive, and Broadway Road. However, north-south circulation is affected as priority is given to east-west movements along Main Street.

Light rail along 1st Avenue and 1st Street would require infrastructure improvements that include four new traffic signals, which would create additional system-wide delays above and beyond those created by the Main Street alignment. Travel time and delay impacts are more widely dispersed and impact a larger area for the 1st Avenue and 1st Street alignment than those associated with the Main Street alignment. As such, the Main Street alignment is less disruptive to overall traffic operations in the Town Center area than the 1st Street/1st Avenue alignment.

The following sections discuss the transportation recommendations for each mode.

Town Center Streets

The downtown street system includes section line streets on Country Club Drive, University Drive, Broadway Road, and Mesa Drive; Main Street and Center Street, which are half-mile streets; and a finer street network within the one-mile square. Currently, Country Club Drive has six through lanes in the study area, while University Drive, Mesa Drive, Broadway Road, Center Street, and Main Street all have four through lanes.

To facilitate the orderly development of the Town Center street network, the major streets have been characterized as traffic-oriented streets, transit-oriented streets, and pedestrian-oriented streets (Figure 9-1). The categories provide a focus for improvements within a corridor, but do not preclude the other modes. A definition of each category follows.

The redevelopment of the Town Center is a focus for the City of Mesa. A number of projects and strategies that support economic redevelopment of the area, with an emphasis on enhancing the pedestrian environment, have been identified. These include streetscape

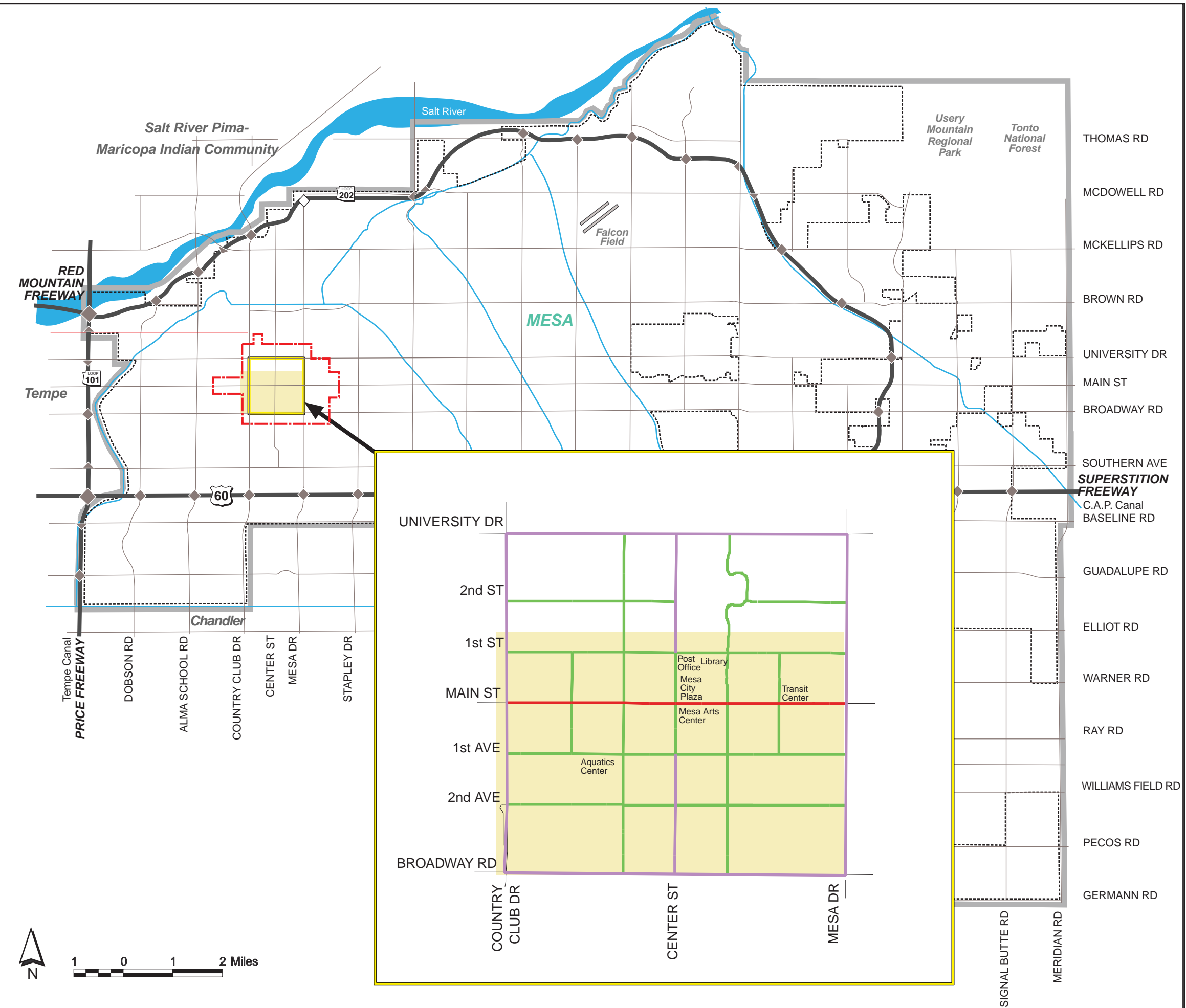
Transportation Plan



Town Center Transportation Concept

Figure 9-1

- Town Center Limits
- Traffic Oriented Streets
- Transit Oriented Streets
- Pedestrian Oriented Streets
- Town Center LRT Corridor
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways



projects, intersections improvements, and pedestrian linkages, which are described later in this chapter.

Traffic-Oriented Streets

Traffic-oriented streets serve as the primary routes for auto, commercial, and emergency vehicle access into and through Mesa Town Center. They provide access to area destinations, and distribute traffic within the Town Center. Traffic-oriented streets also provide for bicycle and pedestrian access.

Designated traffic-oriented streets include Country Club Drive, Mesa Drive, University Drive, Broadway Road, and Center Street (University Drive to 1st Street and 1st Avenue to Broadway).

Transit-Oriented Streets

Main Street is the only street in the Town Center designated as a Transit-oriented Street, and is the designated corridor for Light Rail Transit (LRT). LRT will operate along a fixed guideway in the middle of the street. Pedestrian and bicycle access along Main Street and to the LRT stations is a priority. Transit Oriented Development (TOD) should be focused along the corridor to help support light rail operations.

Pedestrian-Oriented Streets

Pedestrian-oriented streets provide direct connections into and through Mesa Town Center. Designated streets are intended to define major pedestrian routes and to identify priorities for urban design elements. Urban design treatments may include wide sidewalks to accommodate outdoor seating and street furnishings, street trees, pedestrian level lighting, benches, drinking fountains, trash receptacles, and on-street parking as part of the overall street design.

Designated pedestrian-oriented streets include 2nd Street, 1st Street, 1st Avenue, 2nd Avenue, Robson, Macdonald, Centennial Way, and Hibbert.

1st Avenue / 1st Street One-Way Couplet

Another street option that was examined was the feasibility of converting 1st Avenue and 1st Street to one-way streets. Previous discussion documented the evaluation of providing one-way LRT operation on 1st Avenue and 1st Street and the result was a recommendation to have two-way LRT operation on Main Street. This discussion focuses on vehicular operations.

In general, one-way streets are desirable only if there are two parallel arterial streets 1-2 blocks apart with frequent connections to provide good circulation and minimize "wrong direction" travel. The advantages of one-way streets are increased capacity or the ability to add on-street parking because the center two-way left turn lane is eliminated, ideal traffic signal progression

for the one-way street, and reduced accidents. The disadvantages are increased travel distances, and negative impacts to emergency vehicle access and property access.

One-way operation on 1st Avenue and 1st Street is not recommended for the following reasons: 1) there is no logical termination for the one-way operation; 2) police and fire operations would be negatively impacted because of their location on 1st Street; and 3) businesses and City hall functions along 1st Avenue and 1st Street would be negatively impacted. However, 1st Avenue and 1st Street could be candidates to be narrowed in the future depending how downtown development and re-development occurs.

Street System Analysis

A detailed analysis was conducted to evaluate the existing street network. Several alternative concepts were examined and based on traffic demand, right of way requirements, and neighborhood considerations, a recommended street network was developed. The following are recommendations for the downtown area:

- Narrow Center Street from 1st Street to 1st Avenue to one through lane in each direction, which improves the pedestrian environment in the core area of the Town Center.
- Narrow 1st Street and 1st Avenue between Country Club and Mesa Drive to three lanes (one travel lane in each direction and a center left turn lane) to improve the pedestrian environment.
- Narrow Main Street to one through lane in each direction from Country Club Drive to Mesa Drive to accommodate LRT.
- Improve the intersection of Country Club Drive and University Drive to provide three through lanes, two left turn lanes, and a right turn lane on both University Drive approaches.
- Improve the intersection of University Drive and Center Street to provide two left turn lanes, and a right turn lane on both University Drive approaches, and a right turn lane on both Center Street approaches.
- Improve the intersection of Broadway Road and Center Street to provide two left turn lanes, and a right turn lane on both Broadway Road approaches, and a right turn lane on both Center Street approaches.
- Improve the intersection of Mesa Drive and University Drive to provide two left turn lanes, three through lanes, and a right turn lane on all four approaches.
- Improve the intersection of Mesa Drive and Broadway Road to provide two left turn lanes, three through lanes, and a right turn lane on all four approaches.
- Streetscape project on Hibbert Street between 1st Street and 2nd Street.
- Streetscape project on 2nd Street between Pasadena and Mesa Drive.

- Streetscape project on Macdonald Street between Main Street and 1st Street.
- Streetscape project on Center Street between 1st Street and University and between 1st Avenue and Broadway.
- Various alley improvements.

It is recognized that the five intersection widening projects may be difficult to implement in a downtown environment, due to specific site issues and constraints, potential impacts to historic neighborhoods, and concern for maintaining a pedestrian friendly environment. During the actual project design phase of each project, it may be necessary to scale back the recommended improvements (e.g., eliminating a right turn or shortening the distance the third through lane is carried past the intersection).

Transit

Transit will play an important role in the future Town Center transportation system. Local bus service, a downtown circulator bus, and a future light rail line along Main Street will provide an integrated network of travel options to help reduce dependence on the private auto. Following is a summary of the planned improvements for the Town Center area.

Bus Service

Currently, local bus service is provided on all the arterials in downtown including Country Club Drive, Mesa Drive, Broadway Road, University Drive, Main Street, and Center Street. According to the Transit Plan, the Main Street (Red Line), Country Club (112), and University Drive (30) routes are among the routes with the best weekday performance in the City. Also, the Red Line on Main Street has the highest number of transfers of all local routes.

The Transit Plan, which includes recommendations for the Town Center area, identifies short- and long-term improvements in local bus service. In the short-term, local bus service in downtown is expected to remain as it is today. To supplement this service, a downtown circulator has been identified as part of the Town Center Plan to link major activity centers. The Transit Plan recommends that this circulator be implemented in the short-term. The Downtown Circulator would operate all day with 15-minute frequencies. In the long-term, the Plan suggests that local bus service on Main Street west of Mesa Drive would be discontinued when the LRT is constructed into Town Center. The Plan further identifies a transit center in downtown, as described in the next section.

Transit Center

A new transit center is recommended in downtown Mesa to serve as a central transfer point for local bus service and an intermodal transfer point between bus and LRT. The site will be

determined once the LRT alignment has been defined in the Town Center. An LRT station will be adjacent to the transit center to support the pedestrian oriented environment planned for downtown and to serve as gateways to the City's historic, civic, and commercial downtown core.

The downtown transit center will function as a hub for local and regional transit services and provide a safe and convenient place for transfers between local bus service, LRT, and paratransit. The transit center could also be designed to accommodate special event transit service and private shuttle services operated by employers.

Most bus routes serving the Mesa Town Center would be rerouted to serve the downtown transit center. Routes that are expected to serve the facility include:

- Red Line (Main Street)
- Route 30 (University Drive)
- Route 45 (Broadway Road)
- Route 120 (Mesa Drive)
- Mesa Town Center Circulator

The transit center should include the following features:

- Six (6) bus bays
- Bus turnaround area
- Drop off zone
- Passenger services building
- Shelters and seating
- Electronic display boards
- Real-time passenger information
- Mixed-use development
- Bicycle storage
- Landscaping and lighting
- Public art
- Opportunities for joint retail development
- Opportunities to incorporate a bike station into the transit center
- Other amenities as the site plan is developed

Light Rail Transit (LRT)

Four LRT alignment options were considered for the Mesa Town Center between Country Club Drive and Mesa Drive.

- Option 1: Main Street Double-Track
- Option 2: Main Street/1st Street Single-Track Loop
- Option 3: Main Street/1st Avenue Single-Track Loop
- Option 4: 1st Street/1st Avenue Single-Track Loop

As discussed previously, Option 1 and Option 4 were evaluated in detail to determine potential traffic impacts associated with LRT operations in the Town Center area. In addition, the following includes previously produced technical information related to the four alignment options.

Capital Costs

LRT double-track operation on Main Street has the lowest capital cost among the four alignment options. There is a \$16 million cost difference between the Main Street alignment (Option 1) and the 1st Street/1st Avenue loop (Option 4). It should be noted that these costs are for construction of LRT in the Town Center area only, and do not include construction costs between Longmore and Country Club.

**Table 9-1
LRT Estimated Capital Costs**

Alignment Option	Estimated Capital Cost
Option 1: Main Street Double-Track	\$31.3 million
Option 2: Main Street/1 st Street Loop	\$38.1 million
Option 3: Main Street/1 st Avenue Loop	\$37.6 million
Option 4: 1 st Street/1 st Avenue Loop	\$48.2 million

Source: CP/EV LRT Project GEC 2000

Operating Costs

Options 2, 3, and 4 would be 0.9 to 1.2 miles longer than Option 1 and add at least one additional station to the line. The loop alignment options would also require additional intersections to be signalized. The increased travel times and longer distances for Options 2, 3, and 4 make the operating costs higher than Option 1.

Convenience of Service

The key issue for LRT in the Mesa Town Center is whether to have LRT serve existing activity centers north of Main Street or focus on future redevelopment (Mesa Arts Center and Aquatic Center) south of Main Street on 1st Avenue. Double-track LRT on Main Street is the only alignment option that would be equidistant to both existing and future land uses within Mesa Town Center.

Transit Connectivity

Option 1 offers the most direct service into Mesa Town Center and has the best potential for inter-modal transfers between LRT and local bus. A downtown transit center has been proposed on Main Street west of Mesa Drive near the LRT terminus. The loop alignment options could be confusing to riders and would require some backtracking for transfers.

Traffic Impacts

Options 1, 2, and 3 would reduce the number of lanes on Main Street from 4 lanes to 2 lanes, but would not significantly impact the number of parking spaces (parking spaces near intersections may be lost to accommodate LRT and vehicular turn bays). Auto access for future redevelopment projects (Mesa Arts Center and Aquatic Center) would be from 1st Avenue and north/south arterials. The reduction of one lane in each direction with LRT would result in lower auto speeds through downtown and would provide a more pedestrian friendly environment.

As summarized previously, Option 1 would have a lesser impact on overall traffic operations than Option 4. In addition, Option 4 would necessitate additional capital expenditures to mitigate traffic impacts and add four new traffic signals.

Construction Impacts

Construction impacts are expected to be a prime concern for merchants along Main Street. This area has experienced the effects of recent streetscape improvement construction. It is possible to preserve the existing streetscape and landscaped median along Main Street with Option 1. LRT would essentially operate in the existing inside lane (next to the median) in each direction on Main Street.

Future LRT Extensions

Option 1 would provide the most convenient starting point for an LRT extension to the east or south. Extension of the loop alignments (Options 2, 3, and 4) would be more difficult since they could require some out-of-direction travel.

LRT Recommendation

The plan recommends further analysis and public review before selecting the LRT alignment between Country Club Drive and Mesa Drive in the Town Center Area. During the planning process, concern was expressed about running LRT on Main Street through the Town Center area. In addition, MAG is currently conducting a Regional High Capacity Transit Study, which could recommend a future commuter rail line in the vicinity of the Town Center. Once MAG's study is completed, the City of Mesa should initiate an alignment study to identify the preferred route for LRT through the Town Center area.

Commuter Rail

It should be noted that commuter rail has been identified as a possible mode of high capacity transit between Mesa, Phoenix, and other regional destinations. MAG is currently conducting the *High Capacity Transit Study* to determine the feasibility of commuter rail in Maricopa County. A potential connection between light rail and commuter rail could be provided for commuters if the Union Pacific Railroad line is utilized for commuter rail service. This could have an impact on the extension of light rail to the Town Center.

Pedestrian System

Some of the interior sidewalks of the downtown core area between Country Club and Mesa Drive and between University Avenue and Broadway Road have been improved to accommodate pedestrians and provide an inviting walking environment. Additionally, some of the sidewalks inside this one-mile block have been enhanced with setbacks, landscaping, awnings and mid-block crossings that make the Town Center a pleasure to walk.

The Town Center Concept Plan promotes the pedestrian environment on Main Street and extends pedestrian linkages throughout the Town Center. Specifically, the Plan includes pedestrian linkages from University Drive to Broadway Road in an Urban Campus setting. The linkages would connect to proposed mid-block pedestrian paseos (walkways) and people-oriented plazas.

The Concept Plan includes an urban landscaped edge along the arterial streets around Town Center that provides a pedestrian open space and frames the area. Additional recommendations include a downtown cultural walk and providing pedestrian amenities throughout the Town Center such as benches, trees, pedestrian-level lighting, and public art.

Bicycle System

Currently, in the downtown area, there are bike lanes (marked and signed facilities) on Main Street and Center Street. According to the Bicycle Plan, University Drive through the study area will be designated as a bike route in the future, and 1st Street is currently designated as a bike route.

In addition to bike lanes and routes, additional facilities are needed to accommodate bicyclists in downtown. End of trip facilities such as bicycle parking, changing facilities, and storage lockers should be provided as part of the downtown development. Specifically, the Bicycle Plan states that bicycle parking should be provided along the sidewalks in high activity areas like Mesa Town Center. In addition, the Plan suggests that a bike station should be considered during the development of the planned transit center in downtown.

Summary of Recommendations

1. Design and operate downtown streets based on a primary focus for traffic-oriented streets, transit oriented streets, and pedestrian oriented streets.
2. Emphasize convenient and enjoyable pedestrian travel and interaction throughout the Town Center Area through continued capital investments and future redevelopment projects.

3. Improve traffic-oriented streets and intersections in Town Center area (Country Club, Mesa Drive, University, and Broadway) to avoid diverting through traffic onto pedestrian-oriented and transit-oriented streets.
4. Do not reconfigure 1st Street and 1st Avenue to one-way streets.
5. Narrow 1st Street, 1st Avenue, and Center Street (1st Street to 1st Avenue) to three lanes (one travel lane in each direction and a center turn lane) to improve the pedestrian environment.
6. Streetscape project on Macdonald Street, Hibbert Street, 2nd Street, and Center Street.
7. Continue to make improvements to the transit system, including the addition of a circulator and a transit center, in Town Center.
8. Continue the light rail transit system in Town Center.
9. Continue improving the bicycle system, including the addition of bikeways, parking facilities, and a possible bike station at the proposed transit center.

Cost

The estimated cost for the Town Center improvements is \$31.4 million. It includes the street and alley improvements in the Town Center and the pedestrian enhancements. It does not include the major intersection improvements or the transit improvements, which are accounted for in their respective plans.

10.0 FINANCE PLAN



Goal T-4 of this Transportation Plan states that the City should “develop a plan that can be funded and reflects responsible use of public funds.” Although the plan presented in the previous chapters is balanced and addresses the needs of the residents of Mesa, it cannot be completely implemented using existing revenue sources. The following sections summarize the projected cost of the plan, estimated revenue based on existing sources, and potential new funding sources to offset the funding shortfall. The financial analysis assumes that the plan will be implemented over a 25-year period and so both costs and revenue are projected over that period.

Cost

The cost of the various plan elements was presented in the previous chapters. The following discussion and table summarizes the cost to implement, maintain, and operate the transportation system over a 25-year period. The costs are presented in 2002 dollars.

Street Plan Costs

The preferred alternative for the street system includes a variety of projects, which are summarized below.

• Number of intersection improvements	20
• New two-lane street	1.5 miles
• New four-lane street.....	26 miles
• New six-lane street.....	72.75 miles
• Widen from four to six lanes.....	72.25 miles
• New four-lane parkway	1 mile
• New six-lane parkway with system interchange.....	4.5 miles
• Convert six-lane arterial to parkway	6.5 miles

The capital cost to implement the street plan includes construction cost and other capital cost described below.

- The construction cost for priority 1 projects is \$142 million.
- The construction cost for priority 2 projects is \$139 million.
- The construction cost for priority 3 projects is \$169 million.
- The construction cost for priority 4 projects is \$184 million.
- The construction cost for priority 5 projects is \$154 million.
- \$200,000 per year in priority groups 1-5 for arterial street lighting.
- \$500,000 per year in priority groups 1-5 for City share of street lighting.
- \$600,000 per year in priority groups 1-5 for City share of additional pavement width.
- \$500,000 per year in priority groups 1-5 for new traffic signals and upgrades.
- \$250,000 per year in priority groups 1-5 for miscellaneous street improvements.
- \$200,000 per year in priority groups 1-5 for residential street lighting (spot improvements).
- \$250,000 per year in priority groups 1-5 for design.
- \$1,000,000 per year is allocated in priority groups 1-2 for freeway enhancement (e.g., landscape, art, added turn lanes on arterial streets at freeway interchanges to improve access).
- \$6,000,000 per year is allocated in priority group 2 for local partnering (with ADOT or MAG) funds for Hawes Parkway and Traffic Interchange.
- \$300,000 per year is allocated in priority groups 1-5 for neighborhood street lighting (outside CDBG area).

- \$500,000 per year is allocated in priority groups 1-5 for arterial street landscape rehabilitation.
- \$400,000 per year is allocated in priority groups 1-5 for neighborhood traffic management.
- \$500,000 per year is allocated in priority groups 1-5 for Intelligent Transportation Systems (ITS).
- \$500,000 per year is allocated in priority groups 3-5 for bridge rehabilitation.

The cost to operate and maintain the street system includes the following.

- The cost for streets-pavement management (includes fog seal, overlay, and reconstruction projects) was estimated to be \$15 million per year for the first five-year period, which includes \$5 million per year additional in the first five years to compensate for recently deferred projects. For each subsequent five-year period, the amount was computed based on the number miles of four-lane and six-lane streets compared to period 1.
- The cost for street operations and maintenance (includes street sweeping, landscaping, shared-use paths, and in-house pavement and sidewalk projects) was estimated to be \$10.5 million per year for the first five-year period. For each subsequent five-year period, the amount was computed based on the number of miles of four and six lane streets compared to period 1. An additional \$500,000 per year was included for arterial landscape enhancement, \$30,000 per year was included for pedestrian enhancements, \$24,000 per year was included for miscellaneous street improvements, and \$40,000 per year for shared-use paths.
- The cost for traffic operations and maintenance (includes technical staff, administration, studies, planning, signals, signs, street lights, and pavement markings) was estimated to be \$10.8 million per year for the first five-year period. For each subsequent five-year period, the amount was computed based on the number of miles of four and six lane streets compared to period 1. An additional \$200,000 per year was included for enhanced traffic safety education, \$40,000 per year was included for miscellaneous street improvements, \$20,000 per year was included for neighborhood street lighting, \$300,000 per year was included for neighborhood traffic management, and \$40,000 was included for ITS.

Transit Plan Costs

The transit plan includes a significant expansion to the vehicle fleet and facilities as summarized below.

- 19 additional and replacement 30-foot buses
- 248 additional and replacement 40 foot buses
- 23 additional and replacement 45 foot buses

- 12 LRT vehicles
- 4 park and ride facilities
- transit center
- 90 shelters
- 4 miles of LRT line

The cost to implement and operate the transit plan includes the following.

- The capital cost for priority 1 projects is \$97 million (\$61.3 million for LRT and \$35.7 million for bus).
- The capital cost for priority 2 projects is \$136 million (\$114 million for LRT and \$22 million for bus).
- The capital cost for priority 3 projects is \$22 million.
- The capital cost for priority 4 projects is \$39 million.
- The capital cost for priority 5 projects is \$39 million.
- \$600,000 per year is allocated in priority groups 1-3 for transit enhancements (includes track upgrades, public art, landscaping, covered parking at park and ride lots, and bus pull outs) and is included in the above capital cost.
- The operating cost for priority 1 projects is \$60 million.
- The operating cost for priority 2 projects is \$88 million.
- The operating cost for priority 3 projects is \$111 million.
- The operating cost for priority 4 projects is \$130 million.
- The operating cost for priority 5 projects is \$145 million.

Bicycle Plan Costs

The bicycle plan has three primary components, bike route, bike lanes, and shared use paths. Bike routes and bike lanes are components of the street cross section and are included in the street plan cost. Shared use paths are separate paths along the canals and US 60 and the cost is itemized separately here.

- The capital cost for 64 miles of shared use paths is \$49 million, which was divided equally over 25 years (the cost for bicycle lanes is included in the street plan cost).

Pedestrian Plan Costs

The pedestrian plan includes a recommendation to provide \$500,000 to \$1 million in funding for pedestrian enhancements and to help create urban places that are pedestrian friendly.

- \$750,000 per year is allocated in priority groups 1-5 for the pedestrian plan (for areas outside the Town Center).

Town Center Plan Costs

The Town Center Plan includes streetscape projects and pedestrian linkages designed to enhance the pedestrian environment and improve circulation in the downtown.

The cost to implement the Town Center Plan is:

- \$6.3 million in priority groups 1
- \$12.1 million in priority groups 2
- \$8.9 million in priority groups 3
- \$2.5 million in priority groups 4
- \$1.5 million in priority groups 5

Cost Summary

The total estimated cost in 2002 dollars to implement, operate, and maintain the transportation system is summarized by category in Table 10-1. The total estimated cost is \$2.9 billion with \$1.94 billion for the street plan, \$32.3 million for the Town Center plan, \$866 million for the transit plan, \$49 million for the bicycle plan (shared-use path component), and \$19 million for the pedestrian plan. Figure 10-1 is a graphical presentation of the allocation of cost to the various modes.

Figure 10-1: Cost Allocation

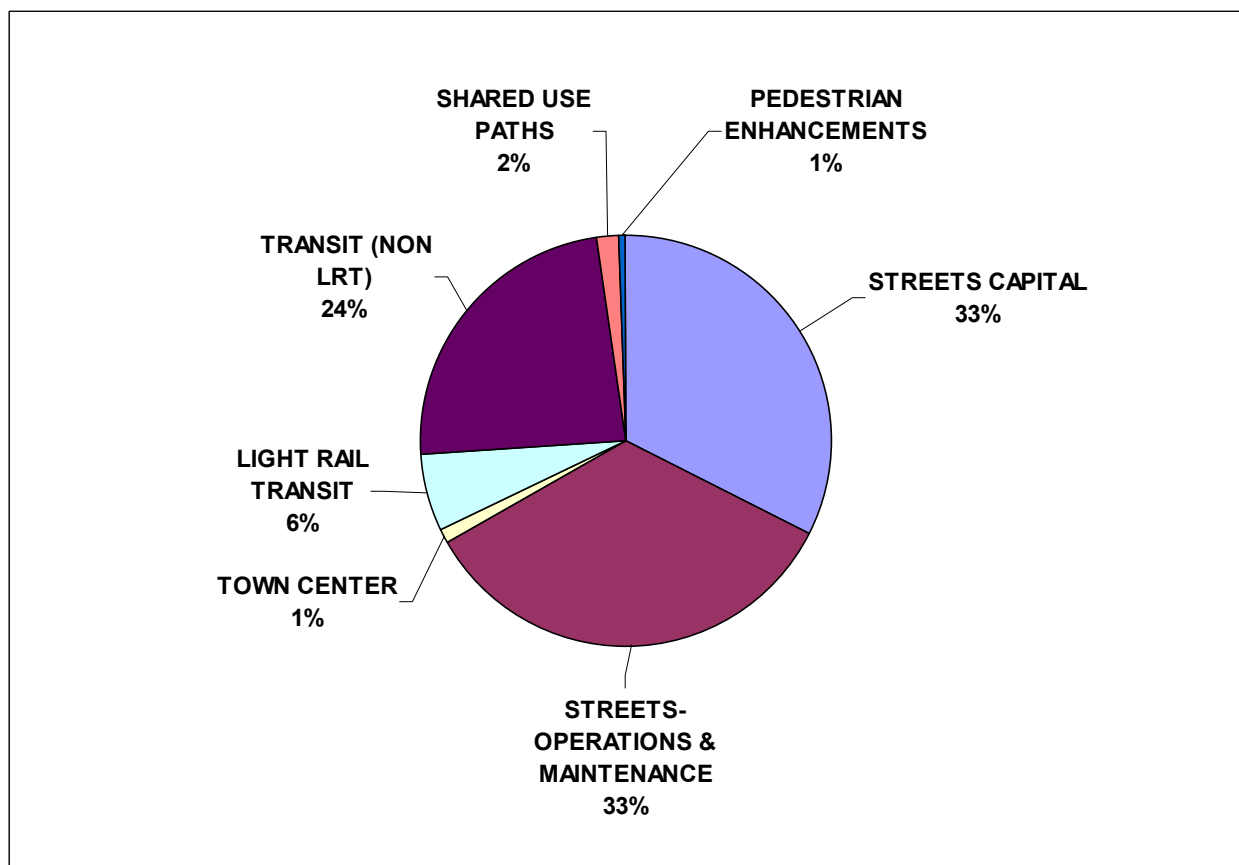


Table 10-1
Transportation Plan Cost (2002 dollars)

	Streets Capital	Streets – Pavement Management	Streets – Operations & Maintenance	Traffic – Operations & Maintenance	Town Center	Transit Capital	Transit Operating	Shared Use Paths	Pedestrian Plan	Total Annual Cost
Current	\$20,500,000	\$5,000,000	\$9,900,000	\$9,800,000		\$2,300,000	\$8,500,000	\$750,000	\$250,000	\$57,000,000
FY 03	\$33,114,000	\$15,000,000	\$11,106,000	\$11,400,000	\$58,000	\$13,584,000	\$9,651,000	\$1,950,000	\$750,000	\$96,613,000
FY 04	\$33,114,000	\$15,000,000	\$11,106,000	\$11,400,000	\$1,748,000	\$20,784,000	\$10,802,000	\$1,950,000	\$750,000	\$106,654,000
FY 05	\$33,114,000	\$15,000,000	\$11,106,000	\$11,400,000	\$2,007,000	\$27,434,000	\$11,953,000	\$1,950,000	\$750,000	\$114,714,000
FY 06	\$33,114,000	\$15,000,000	\$11,106,000	\$11,400,000	\$2,025,000	\$24,934,000	\$13,104,000	\$1,950,000	\$750,000	\$113,383,000
FY 07	\$33,114,000	\$15,000,000	\$11,106,000	\$11,400,000	\$466,000	\$10,759,000	\$14,255,000	\$1,950,000	\$750,000	\$98,800,000
SUBTOTAL	\$165,570,000	\$75,000,000	\$55,530,000	\$57,000,000	\$6,304,000	\$97,495,000	\$59,765,000	\$9,750,000	\$3,750,000	\$530,164,000
FY 08	\$38,920,000	\$11,077,000	\$12,064,000	\$12,343,000	\$3,259,000	\$12,383,000	\$15,238,000	\$1,950,000	\$750,000	\$107,984,000
FY 09	\$38,920,000	\$11,077,000	\$12,064,000	\$12,343,000	\$2,762,000	\$57,491,000	\$16,221,000	\$1,950,000	\$750,000	\$153,578,000
FY 10	\$38,920,000	\$11,077,000	\$12,064,000	\$12,343,000	\$2,762,000	\$57,490,000	\$17,205,000	\$1,950,000	\$750,000	\$154,561,000
FY 11	\$38,920,000	\$11,077,000	\$12,064,000	\$12,343,000	\$2,762,000	\$4,463,000	\$18,188,000	\$1,950,000	\$750,000	\$102,517,000
FY 12	\$38,920,000	\$11,077,000	\$12,064,000	\$12,343,000	\$537,000	\$4,463,000	\$19,171,000	\$1,950,000	\$750,000	\$101,275,000
SUBTOTAL	\$194,600,000	\$55,385,000	\$60,320,000	\$61,715,000	\$12,082,000	\$136,290,000	\$86,023,000	\$9,750,000	\$3,750,000	\$619,915,000
FY 13	\$38,450,000	\$11,798,000	\$12,702,000	\$12,928,000	\$2,227,000	\$4,463,000	\$20,154,000	\$1,950,000	\$750,000	\$105,422,000
FY 14	\$38,450,000	\$11,798,000	\$12,702,000	\$12,928,000	\$2,227,000	\$4,463,000	\$21,138,000	\$1,950,000	\$750,000	\$106,406,000
FY 15	\$38,450,000	\$11,798,000	\$12,702,000	\$12,928,000	\$2,227,000	\$4,463,000	\$22,121,000	\$1,950,000	\$750,000	\$107,389,000
FY 16	\$38,450,000	\$11,798,000	\$12,702,000	\$12,928,000	\$1,814,000	\$4,463,000	\$23,104,000	\$1,950,000	\$750,000	\$107,959,000
FY 17	\$38,450,000	\$11,798,000	\$12,702,000	\$12,928,000	\$400,000	\$4,463,000	\$24,087,000	\$1,950,000	\$750,000	\$107,528,000
SUBTOTAL	\$192,250,000	\$58,990,000	\$63,510,000	\$64,640,000	\$8,895,000	\$22,315,000	\$110,604,000	\$9,750,000	\$3,750,000	\$534,704,000
FY 18	\$41,510,000	\$13,113,000	\$13,846,000	\$14,086,000	\$500,000	\$7,881,000	\$24,702,000	\$1,950,000	\$750,000	\$118,338,000
FY 19	\$41,510,000	\$13,113,000	\$13,846,000	\$14,086,000	\$500,000	\$7,881,000	\$25,317,000	\$1,950,000	\$750,000	\$118,953,000
FY 20	\$41,510,000	\$13,113,000	\$13,846,000	\$14,086,000	\$500,000	\$7,881,000	\$25,932,000	\$1,950,000	\$750,000	\$119,568,000
FY 21	\$41,510,000	\$13,113,000	\$13,846,000	\$14,086,000	\$500,000	\$7,881,000	\$26,547,000	\$1,950,000	\$750,000	\$120,183,000
FY 22	\$41,510,000	\$13,113,000	\$13,846,000	\$14,086,000	\$500,000	\$7,881,000	\$27,162,000	\$1,950,000	\$750,000	\$120,798,000
SUBTOTAL	\$207,550,000	\$65,565,000	\$69,230,000	\$70,430,000	\$2,500,000	\$39,405,000	\$129,660,000	\$9,750,000	\$3,750,000	\$597,840,000
FY 23	\$36,740,000	\$15,187,000	\$15,831,000	\$16,125,000	\$500,000	\$7,881,000	\$27,777,000	\$1,950,000	\$750,000	\$122,741,000
FY 24	\$36,740,000	\$15,187,000	\$15,831,000	\$16,125,000	\$500,000	\$7,881,000	\$28,392,000	\$1,950,000	\$750,000	\$123,356,000
FY 25	\$36,740,000	\$15,187,000	\$15,831,000	\$16,125,000	\$500,000	\$7,881,000	\$29,007,000	\$1,950,000	\$750,000	\$123,971,000
FY 26	\$36,740,000	\$15,187,000	\$15,831,000	\$16,125,000	\$500,000	\$7,881,000	\$29,622,000	\$1,950,000	\$750,000	\$124,586,000
FY 27	\$36,740,000	\$15,187,000	\$15,831,000	\$16,125,000	\$500,000	\$7,881,000	\$30,237,000	\$1,950,000	\$750,000	\$125,201,000
SUBTOTAL	\$183,700,000	\$75,935,000	\$79,155,000	\$80,625,000	\$2,500,000	\$39,405,000	\$145,035,000	\$9,750,000	\$3,750,000	\$619,855,000
TOTAL	\$943,670,000	\$330,875,000	\$327,745,000	\$334,410,000	\$32,281,000	\$334,910,000	\$531,087,000	\$48,750,000	\$18,750,000	\$2,902,478,000

Revenue

The City currently uses several revenue sources as described below to fund transportation. These sources are typically used for capital projects; however, LTAF, HURF, and General Fund can also be used for operations and maintenance.

LTAF

The Local Transportation Assistance Fund is generated by the state lottery. The amount distributed to cities and towns has been a constant \$23 million over the last several years and is also expected to continue. This money is distributed on a population basis to incorporated cities. LTAF can be used for any transportation purpose including streets, traffic, transit, airports, and bicycles and can be used for operations and maintenance or capital improvements.

Local Transportation Assistance Fund II (LTAF II)

In 1998, House Bill 2565 was signed into law by Governor Jane Hull. The legislation enables a portion of the state's Vehicle License Tax (VLT) revenue to be used to assist city, town, and county governments in meeting their local transportation needs. It is a five-year program that expires in 2003. The bill has become known as the LTAF II. Funding from this legislation is similar in nature to the existing LTAF/lottery funding mentioned above.

The LTAF II annually allocates a portion of ADOT's VLT to LTAF in an amount equal to ADOT's Surface Transportation Program (STP) monies in excess of \$42 million. Based on population, ADOT calculates maximum funds available for each city, town, and county. Disbursements are made to Mesa via the Regional Public Transportation Authority in the Phoenix metropolitan area. The distribution is in equal amounts on a quarterly basis.

Eligible uses of the funds are dependent on the size of the jurisdiction. Because Mesa is over 50,000 in population and in Maricopa County, projects must be transit only and conform with long range or regional transportation plans.

HURF

The Highway User Revenue Funds are primarily gasoline and vehicle license tax. They are available to the State, counties, and cities. The state receives 50.5 percent of the HURF dollars to be used statewide, the cities receive 27.5 percent, cities over 300,000 population receive an additional 3 percent, and counties receive 19 percent. The city and county distribution is based on population and gasoline sales. The HURF revenues have historically increased. However, the increase in HURF revenues has not kept pace with growth. HURF can be used for streets only, but can be used for operations and maintenance or capital improvement.

STP

The Surface Transportation Program (STP) provides flexible funding that may be used by States and localities for projects on any Federal-aid highway including the National Highway System (NHS), bridge projects on any public road, transit capital projects, and public bus terminals and facilities. These funds are distributed by ADOT and MAG.

In June 1999, the State Transportation Board made a decision to transfer \$5 million of TEA-21 STP funding into transit to be available in SFY 2000. In order to compete for the \$5 million in STP funding, Mesa must use 100 percent of HB 2565 funding for transit purposes only and the project must be included in the current MAG Transportation Improvement Program (TIP).

CMAQ

The Congestion Mitigation and Air Quality (CMAQ) Improvement program provides a flexible funding source to States and local governments for transportation projects and programs that help meet the requirements of the Clean Air Act. Eligible activities include transit improvements, travel demand management strategies, traffic flow improvements, and public fleet conversions to cleaner fuels.

FTA Section 5309 Capital Investment Grants and Loans Program

Section 5309 is the primary federal funding program for capital investment in new transit facilities and equipment. Funds are allocated by statute as follows: New Rail Starts (and extensions) – 40 percent, Rail Modernization – 40 percent, and Bus Capital Projects – 20 percent. New starts are authorized based on the results of alternatives analysis and preliminary engineering that justify the project based on a variety of criteria. In practice, all rail new start funds and bus replacement funds are now allocated to projects through earmarks in annual federal appropriations legislation.

FTA Section 5307 Urban Formula Grants (Capital and Operations)

The Federal Section 5307 formula program is allocated to urbanized areas over 50,000 in population, according to a tiered formula based on size. The FTA has traditionally only awarded grants to one recipient per urbanized area, leaving that recipient to then pass funds through to other qualified users. The program is structured to provide total flexibility to end-users regarding use of the funds for capital outlay and operating support. TEA-21 eliminates eligibility for operating assistance in areas over 200,000 in population, but expands the definition of capital expenses in these areas to include preventive maintenance.

Developer Contributions

It is common practice for the city to require developers to dedicate right-of-way for all streets adjacent to a development and to construct the adjacent half street.

Street Bonds

The City regularly uses bonds to fund street construction projects. The amount varies from year to year and the bonds are typically repaid using HURF revenues.

Grants

The City regularly applies for grants from the Federal Highway Administration, ADOT, and Maricopa County to implement certain projects. The availability of these grants varies from year to year and the city must demonstrate a need for the grant. The City must compete for these grants with other jurisdictions.

Mesa Quality of Life Sales Tax

In May 1998, Mesa voters approved a 0.5 percent sales tax for Quality of Life improvements. At the end of 2006, 0.25 of the tax will expire, and the remainder will continue for on-going operations and maintenance needs in the various program areas. These improvements include funding for the following: 1) public safety (police and fire); 2) library, recreational, and cultural; 3) arts and entertainment, and 4) transportation (primarily transit). Total transportation funding accounted for approximately 15% of the Quality of Life Sales Tax. Streets activities included funding for left turn lanes and intelligent transportation systems. Transit activities included funding for bus pullouts, transit capital, transit maintenance, and service expansions.

Revenue Summary

The City's transportation revenue for the past three years is summarized in Table 10-2. As seen in Table 10-2 the revenue has been increasing steadily over the past three years. The revenue for the first half of the current fiscal year (FY 02) is \$33.1 million.

Table 10-2
Transportation Revenue History (millions)

Program	FY 01	FY 00	FY 99
Program 8100-Streets	\$35.923	\$36.733	\$41.283
Program 9800 Street Bonds	\$10.868	\$10.993	\$4.741
Program 8860 Mass Transit	\$13.696	\$9.750	\$4.589
TOTAL	\$60.487	\$57.476	\$50.613

The revenue projections for the transportation plan were based on the most recent three years for the City transportation program adjusted to account for the reduction in the Quality of Life tax from ½ cent to ¼ cent in 2006. The current revenue was separated into street revenue and transit revenue. In addition, it was assumed that the City would be reimbursed for 50 percent of the LRT cost, 50 percent of bus purchases and facilities, and that the City practice of developer

contributions for street improvements would continue. The revenue was projected in constant dollars.

The estimated revenue per year by category for the transportation plan is shown in Table 10-3. The total estimated revenue is \$1.49 billion in 2002 dollars. Figure 10-2 is a graphical presentation of the revenue by category.

Figure 10-2: Revenue Sources

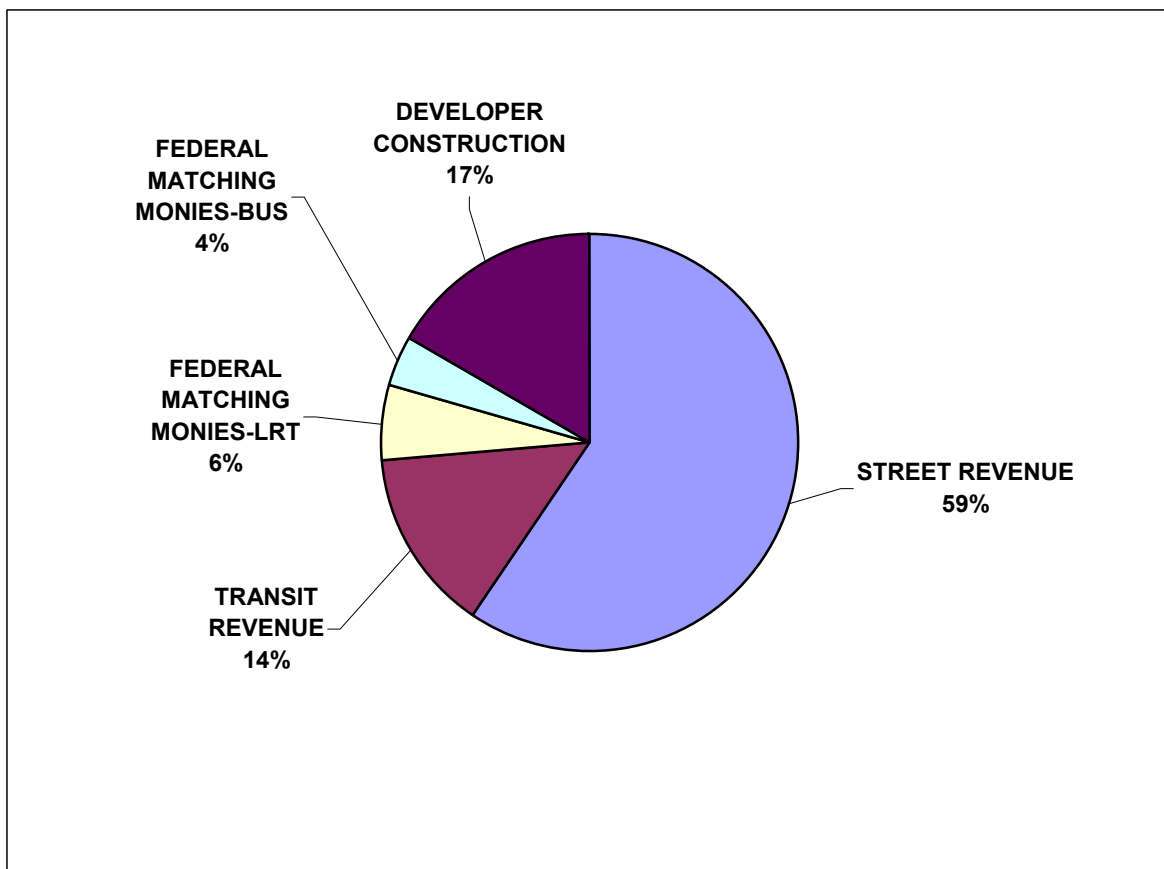


Table 10-3
Transportation Plan Projected Revenue (2002 dollars)

	Streets – Revenue Projection	Mass Transit – Revenue Projection	LRT Federal Matching Funds (50/50)	Bus Federal Matching Funds (50/50)	Developer Contribution for Streets	Total Revenue
FY 03	\$35,525,000	\$11,147,000	\$1,950,000	\$2,827,000	\$4,050,000	\$55,499,000
FY 04	\$35,525,000	\$10,659,000	\$1,950,000	\$2,827,000	\$4,050,000	\$55,011,000
FY 05	\$35,525,000	\$8,263,000	\$4,400,000	\$2,827,000	\$4,050,000	\$55,065,000
FY 06	\$35,525,000	\$8,363,000	\$4,400,000	\$2,827,000	\$4,050,000	\$55,165,000
FY 07	\$35,525,000	\$8,391,000	\$2,762,500	\$2,827,000	\$4,050,000	\$53,555,500
SUBTOTAL	\$177,625,000	\$46,823,000	\$15,462,500	\$14,135,000	\$20,250,000	\$274,295,500
FY 08	\$35,525,000	\$8,861,000	\$6,300,000	\$1,036,500	\$540,000	\$52,262,500
FY 09	\$35,525,000	\$8,070,000	\$6,930,000	\$1,036,500	\$540,000	\$52,101,500
FY 10	\$35,525,000	\$8,070,000	\$7,623,000	\$1,036,500	\$540,000	\$52,794,500
FY 11	\$35,525,000	\$8,070,000	\$8,385,000	\$1,036,500	\$540,000	\$53,556,500
FY 12	\$35,525,000	\$8,070,000	\$9,224,000	\$1,036,500	\$540,000	\$54,395,500
SUBTOTAL	\$177,625,000	\$41,141,000	\$38,462,000	\$5,182,500	\$2,700,000	\$265,110,500
FY 13	\$35,525,000	\$8,070,000	\$10,146,000	\$1,036,500	\$11,538,000	\$66,315,500
FY 14	\$35,525,000	\$8,070,000	\$11,161,000	\$1,036,500	\$11,538,000	\$67,330,500
FY 15	\$35,525,000	\$8,070,000	\$12,411,000	\$1,036,500	\$11,538,000	\$68,580,500
FY 16	\$35,525,000	\$8,070,000		\$1,036,500	\$11,538,000	\$56,169,500
FY 17	\$35,525,000	\$8,070,000		\$1,036,500	\$11,538,000	\$56,169,500
SUBTOTAL	\$177,625,000	\$40,350,000	\$33,718,000	\$5,182,500	\$57,690,000	\$314,565,500
FY 18	\$35,525,000	\$8,070,000		\$3,495,500	\$18,360,000	\$65,450,500
FY 19	\$35,525,000	\$8,070,000		\$3,495,500	\$18,360,000	\$65,450,500
FY 20	\$35,525,000	\$8,070,000		\$3,495,500	\$18,360,000	\$65,450,500
FY 21	\$35,525,000	\$8,070,000		\$3,495,500	\$18,360,000	\$65,450,500
FY 22	\$35,525,000	\$8,070,000		\$3,495,500	\$18,360,000	\$65,450,500
SUBTOTAL	\$177,625,000	\$40,350,000	\$0	\$17,477,500	\$91,800,000	\$327,252,500
FY 23	\$35,525,000	\$8,070,000		\$3,495,500	\$15,120,000	\$62,210,500
FY 24	\$35,525,000	\$8,070,000		\$3,495,500	\$15,120,000	\$62,210,500
FY 25	\$35,525,000	\$8,070,000		\$3,495,500	\$15,120,000	\$62,210,500
FY 26	\$35,525,000	\$8,070,000		\$3,495,500	\$15,120,000	\$62,210,500
FY 27	\$35,525,000	\$8,070,000		\$3,495,500	\$15,120,000	\$62,210,500
SUBTOTAL	\$177,625,000	\$40,350,000	\$0	\$17,477,500	\$75,600,000	\$311,052,500
TOTAL	\$888,125,000	\$209,014,000	\$87,642,500	\$59,455,000	\$248,040,000	\$1,492,276,500

Cost – Revenue Comparison

The total estimated cost and the projected revenue is shown graphically in Figure 10-3 and summarized in Table 10-4. As can be seen, the annual deficit starts is \$41 million for the first year and increases to \$62 million in the year 25 of the plan for a total shortfall of \$1.4 billion.

Figure 10-3: Cost – Revenue Comparison

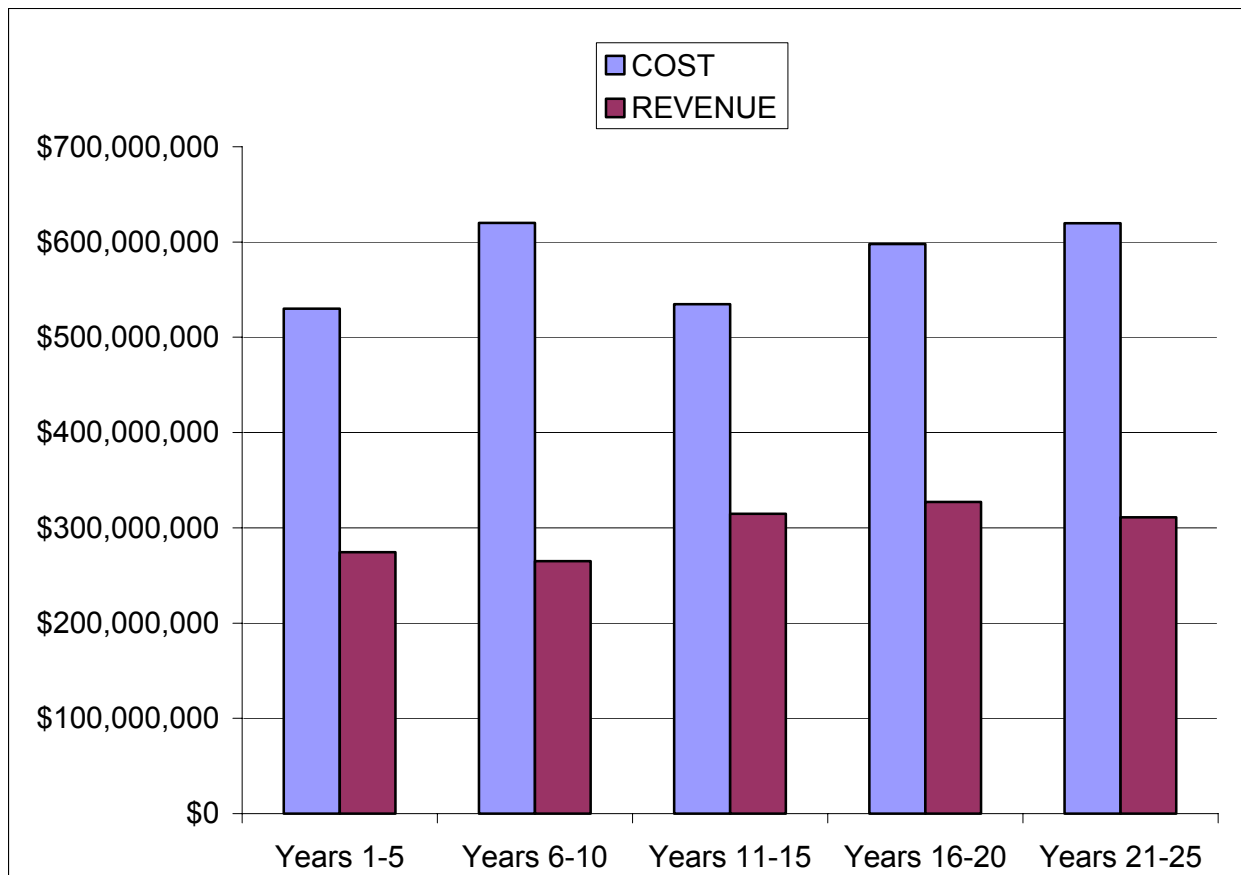


Table 10-4
Cost / Revenue Comparison (2002 dollars)

	TOTAL ANNUAL COST	TOTAL REVENUE	REVENUE - COST
FY 03	\$96,613,000	\$55,499,000	-\$41,114,000
FY 04	\$106,654,000	\$55,011,000	-\$51,643,000
FY 05	\$114,714,000	\$55,065,000	-\$59,649,000
FY 06	\$113,383,000	\$55,165,000	-\$58,218,000
FY 07	\$98,800,000	\$53,555,500	-\$45,244,500
SUBTOTAL	\$530,164,000	\$274,295,500	-\$255,868,500
FY 08	\$107,984,000	\$52,262,500	-\$55,721,500
FY 09	\$153,578,000	\$52,101,500	-\$101,476,500
FY 10	\$154,561,000	\$52,794,500	-\$101,766,500
FY 11	\$102,517,000	\$53,556,500	-\$48,960,500
FY 12	\$101,275,000	\$54,395,500	-\$46,879,500
SUBTOTAL	\$619,915,000	\$265,110,500	-\$354,804,500
FY 13	\$105,422,000	\$66,315,500	-\$39,106,500
FY 14	\$106,406,000	\$67,330,500	-\$39,075,500
FY 15	\$107,389,000	\$68,580,500	-\$38,808,500
FY 16	\$107,959,000	\$56,169,500	-\$51,789,500
FY 17	\$107,528,000	\$56,169,500	-\$51,358,500
SUBTOTAL	\$534,704,000	\$314,565,500	-\$220,138,500
FY 18	\$118,338,000	\$65,450,500	-\$52,887,500
FY 19	\$118,953,000	\$65,450,500	-\$53,502,500
FY 20	\$119,568,000	\$65,450,500	-\$54,117,500
FY 21	\$120,183,000	\$65,450,500	-\$54,732,500
FY 22	\$120,798,000	\$65,450,500	-\$55,347,500
SUBTOTAL	\$597,840,000	\$327,252,500	-\$270,587,500
FY 23	\$122,741,000	\$62,210,500	-\$60,530,500
FY 24	\$123,356,000	\$62,210,500	-\$61,145,500
FY 25	\$123,971,000	\$62,210,500	-\$61,760,500
FY 26	\$124,586,000	\$62,210,500	-\$62,375,500
FY 27	\$125,201,000	\$62,210,500	-\$62,990,500
SUBTOTAL	\$619,855,000	\$311,052,500	-\$308,802,500
TOTAL	\$2,902,478,000	\$1,492,276,500	-\$1,410,201,500

Potential New Revenue Sources

There are a number of potential revenue sources, both new and modifications/additions to existing, that the city could consider to fund the transportation program shortfall. These are briefly described below. It should be noted that no one source is expected to generate enough revenue to offset the shortfall. It is likely that a combination of additional revenue sources will be required. The impact fee and sales tax are listed first with an estimate of the potential revenue. The other potential sources are relatively small and can vary greatly and no estimate of revenue is provided.

Sales Tax

A sales tax exclusively for transportation needs is another revenue option to be considered. This is currently being used by a number of cities (Phoenix, Glendale, Tempe, and Scottsdale) to fund exclusively transportation improvements. Unlike some of the revenue sources previously described, which are typically just used for street improvements, a transportation sales tax would be used for streets, transit, bicycle, and pedestrian facilities identified in the plan. The City currently has a Quality of Life sales tax, a portion of which is used to fund street and transit improvements. The rate is currently ½ cent, which will decline to ¼ cent in 2006.

One option for a new sales tax exclusively for transportation would be to start at a rate of ¼ cent and then increase it to ½ cent in 2006 when the Quality of Life tax changes. Based on current revenue, such a sales tax increase would generate approximately \$805 million over a 25 year period.

Arterial Street Impact Fee Program

An Arterial Street System Impact Fee would cover the cost of identified arterial roadway needs in the developing areas of the City. Several cities in the valley use arterial street impact fees including Chandler and Phoenix. The fee is based on the total cost of identified improvements for the defined benefit area apportioned to land use categories based on their vehicle trip generating characteristics. There are some adjustments to provide for trips unrelated to development and for vehicle trip generation equivalencies among different land use categories.

The benefit of this program compared to the traditional developer contributions is that the City can specify where the improvements will be made, within the benefit area, once the fee has been collected. The disadvantage is that it takes time to put the program in place and begin collecting the fees; funds usually lag travel demands.

Some jurisdictions that use this type of program still allow the developer to make the improvements along their frontage and use them as a credit toward their impact fee. This does

not eliminate the “scalped street” effect nor does it improve the major intersections in a timely manner. To mitigate these problems, impact fee programs have been complemented by a “road completion” or “buy-in reimbursement” program.

Required Improvements by Development

There is a cost to building “first” in undeveloped areas that often goes unrecognized. If a development imposes traffic congestion on the adjacent street system, it can rightly be held responsible for a portion of the required mitigation. The City currently uses this technique for improvements adjacent to the development by requiring developers to build the curb, gutter, and sidewalk and 24 feet of pavement adjacent to their development.

This modification would require developer(s) to make improvements not immediately adjacent to the development(s), but to mitigate impacts caused by a development or a small group of developments. This provides the required nexus. This would require the City to institute a Traffic Impact Study program in order to document the needed improvements caused by new development. It is difficult to assess the financial impact of this technique since the timing and size of individual developments is not known at this time.

Buy-In Reimbursement

The buy-in program requires a developer to “temporarily” fund, through the buy-in fee program, improvements necessary for new and planned future development. The development would cover the pertinent costs and receive reimbursement when properties benefiting from the offsite improvements develop. The transportation improvements made under this plan would need to be designed to full standards at buildout to warrant reimbursement.

Community Facilities District (CFD)

A community facilities district (CFD) would raise funds in a predetermined benefit area that would be expected to benefit from the specified improvements and ongoing maintenance. This requires a vote of the affected citizens and imposes a new, deductible assessment. A CFD would require formation of a CFD board of directors (could be the City Council) and would also fund some ongoing costs (e.g., maintenance) related to the improvements. There are some existing CFDs in Arizona.

Community facilities districts are used for certain defined areas that meet policy requirements. CFD’s are not used as funding sources for an entire city.

Transportation Utility

Though state legislation on utilities does not currently include transportation, a transportation utility could cover capital and operating costs (or a portion thereof) for a defined transportation program, such as street maintenance, street lighting energy costs or landscape maintenance,

freeing current funding for use on other transportation needs. A utility is a kind of usage fee, levied on the level of use of the transportation system. The fee could be set to cover only the expenses provided for in the formation of the utility. It is similar to a water resources enterprise fund or a stormwater utility. In practice, a fee would be defined each year in the City's budget to pay for the portion of the transportation budget defined in the utility. Depending on the extent of the utility system components to be covered by the fee, the program could be phased in to minimize the impact on the user.

This would require enabling legislation to give the city authority to implement such a program. Receiving such authority would likely be quite difficult. Currently, only two states are known to allow utility districts, Texas and Oregon.

Utility Cut Fee

The City of Mesa is currently investigating the use of a utility cut fee, which is a charge assessed to private utilities that work in City streets. The fee usually varies based on the age of the pavement and the amount of cut.

Other Options

There are other options, which are described below, that are more suited to public transportation improvements that could be considered.

The parking tax is most commonly thought of as a flat, or sales-based, tax levied on paid commercial parking, typically in downtown commercial districts. As considered by transportation planners, the parking tax has evolved in concept into per-space assessment to be levied on commercial property owners as a disincentive to free parking and drive-alone behavior. To date, a parking tax in this form has not seen implementation.

- A commuter tax can be structured in the form of a payroll head tax, an income tax, or some other form of payroll tax. The income tax method of taxing commuters is relatively complex and is not widely used.
- Turnkey or full service project involves full delegation of project development responsibilities to a single design/build or design/build/operate entity, typically for a fixed price. Cost savings, potentially, can be realized by internalization of the various functions within the single entity.
- Joint development involves co-location of public improvements (e.g., a transit station) and private, for profit development (e.g., a mixed-use development) in a coordinated manner on the same site or on adjacent sites.

11.0 IMPLEMENTATION



The implementation of the transportation plan is a continuous process that will require coordination among various City departments. In order to successfully implement the plan, the City must undertake additional studies, prepare design plans, make capital purchases, and update/expand ordinances, policies, procedures, and guidelines used by the Transportation Division in their day-to-day functions.

Just as important as plan implementation, is the recognition that the plan is a dynamic tool that must be continuously reviewed and updated as conditions warrant. There are no set guidelines for how frequently the plan should be updated. However, based on the substantial growth still occurring in the City, the overall plan should probably be updated in 5-7 years. However, specific area or project studies may be conducted sooner, if appropriate.

The transportation implementation plan is summarized in Table 11-1. The table presents the implementation strategy categorized by each plan element. Next is general information regarding the lead department at the City and the implementation timeframe followed by the financial impact to the City. Last is an action category that describes staff activity needed to implement safety programs, revise engineering standards and procedures, conduct additional studies, and develop new or revised ordinances.

Table 11.1: Implementation Schedule

		General		Financial			Action			
No.	Implementation Strategy	Lead	Timeframe	CIP Project	Operating Budget	Other	Ordinance or Legislation	Research, Study or Plan	Guidelines or Standards	Public Education
Street Plan										
1	Short-Term Streets Capital	Transportation	Years 1-5	\$162,570,000						
2	Medium-Term Streets Capital	Transportation	Years 6-15	\$380,850,000						
3	Long-Term Streets Capital	Transportation	Years 16-25	\$385,250,000						
4	Short-Term Streets Pavement Management	Transportation	Years 1-5		\$75,000,000					
5	Medium-Term Streets Pavement Management	Transportation	Years 6-16		\$114,375,000					
6	Long-Term Streets Pavement Management	Transportation	Years 16-25		\$141,500,000					
7	Short-Term Streets Operations and Maintenance	Street Maintenance	Years 1-5		\$55,530,000					
8	Medium-Term Streets Operations and Maintenance	Street Maintenance	Years 6-15		\$123,830,000					
9	Long-Term Streets Operations and Maintenance	Street Maintenance	Years 16-25		\$148,385,000					
10	Short-Term Traffic Operations and Maintenance	Street Maintenance	Years 1-5		\$54,500,000					
11	Medium-Term Traffic Operations and Maintenance	Street Maintenance	Years 6-16		\$121,355,000					
12	Long-Term Traffic Operations and Maintenance	Street Maintenance	Years 16-25		\$146,055,000					
13	Neighborhood Traffic Management Program	Transportation	On-Going	\$400,000/yr	\$300,000/yr					
14	Traffic Safety Education Program	Transportation	On-Going		\$200,000/yr					■
15	Update City Parking Requirements (include maximum standards)	Planning	Years 1-2				■			
16	Revise Engineering Procedures Manual	Building Safety	Years 1-3						■	
Transit Plan										
1	Short-Term Transit Capital	Transit	Years 1-5	\$97,495,000						
2	Medium-Term Transit Capital	Transit	Years 6-15	\$158,605,000						
3	Long-Term Transit Capital	Transit	Years 16-25	\$78,810,000						
4	Short-Term Transit Operating	Transit	Years 1-5		\$59,765,000					
5	Medium-Term Transit Operating	Transit	Years 6-16		\$196,627,000					
6	Long-Term Transit Operating	Transit	Years 16-25		\$274,695,000					
7	Transit Oriented Development Ordinance	Planning	Year 1				■			

Table 11.1: Implementation Schedule (cont.)

Bicycle Plan										
1	Short-Term Bicycle Projects	Parks	Years 1-5	\$9,750,000	\$200,000					
2	Medium-Term Bicycle Projects	Parks	Years 6-15	\$19,500,000	\$400,000					
3	Long-Term Bicycle Projects	Parks	Years 16-25	\$19,500,000	\$400,000					
4	Bicycle Parking Ordinance	Planning	Year 1				■			
5	Bicycle Safety Education Program	Transportation	On-going							■
Pedestrian Plan										
1	Short-Term Pedestrian Enhancements	Transportation	Years 1-5	\$3,750,000	\$150,000					
2	Medium-Term Pedestrian Enhancements	Transportation	Years 6-15	\$7,500,000	\$300,000					
3	Long-Term Pedestrian Enhancements	Transportation	Years 16-25	\$7,500,000	\$300,000					
4	Pedestrian Oriented Design Guidelines	Planning	Years 2-3						■	
5	Update Engineering Procedures Manual	Building Safety	Years 2-3						■	
TDM Plan										
1	Research and implement innovative TDM strategies	Transportation	On-going					■		■
Town Center Transportation Plan										
1	Short-Term Improvements	Redevelopment	Years 1-5	\$6,304,000						
2	Medium-Term Improvements	Redevelopment	Years 6-15	\$20,977,000						
3	Long-Term Improvements	Redevelopment	Years 16-25	\$4,000,000						
Finance Plan										
1	Explore additional funding options	Transportation	On-going					■		
Future Planning and Coordination										
1	On-going interagency coordination	Transportation	On-going					■	■	■
2	Southeast Mesa Subarea Transportation Plan	Transportation	Years 3-4			\$500,000		■		
3	Update Mesa Transportation Plan	Transportation	Years 5-6			\$250,000		■		
4	Mesa Town Center - LRT Alignment Study	Transportation	Years 2-3			\$200,000		■		